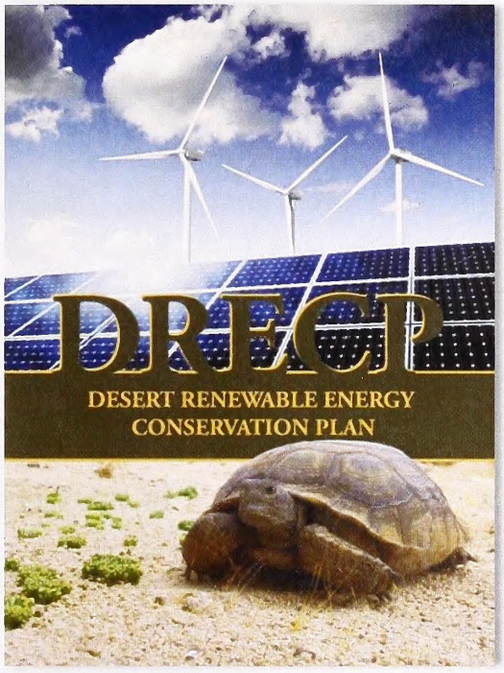
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Desert Renewable Energy Conservation Plan Proposed Land Use Plan Amendment and Final Environmental Impact Statement

Volume III: Environmental Setting/Affected Environment

Part 2 of 2: Chapters III.7 through III.25



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III.7 BIOLOGICAL RESOURCES

The Desert Renewable Energy Conservation Plan (DRECP) Baseline Biology Report (included as Appendix Q to this document) describes the existing biological resources and conditions found in the DRECP Plan Area. The description of biological resources provided in this chapter summarizes information from the Baseline Biology Report and serves as the affected environment/existing setting for biological resources. Citations of data sources are generally provided as they occur in the Baseline Biology Report (Appendix Q).

This chapter is intended to provide an overview of the biological resources in the DRECP Plan Area and serves as a foundation for the analysis of the DRECP's effects on biological resources described in Volume IV, Environmental Consequences/Effects Analysis, of this document. This chapter therefore provides a summary of the detailed description of data sources, methods used to develop the existing biological/ecological setting, and a description of the baseline biological conditions in the DRECP Plan Area presented in the Baseline Biology Report.[1]

There are many existing renewable energy projects within the DRECP Plan Area (shown on Figures III.1-2A and III.1-2B). The DRECP would allow permitting of up to 20,000 megawatts (MW) of renewable energy projects, in addition to these existing projects.

III.7.1 Regulatory Setting

Federal Endangered Species Act. The Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531–1544), as amended, protects federally listed threatened and endangered wildlife species from unlawful take. Under the ESA, the term "threatened species" is defined as "any species which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range" (16 U.S.C. 1532, Definitions). The term "endangered species" is defined as "any species which is in danger of extinction throughout all or a significant portion of its range" (16 U.S.C. 1532, Definitions). As part of implementing the ESA, the U.S. Fish and Wildlife Service (USFWS) also maintains a list candidate species for listing as threatened or endangered that includes "those species for which the Service has on file sufficient information on biological vulnerability and

[1] Rounding of data was applied to raw values to avoid false precision when presenting calculated values. However, in presenting rounded values there were tradeoffs. Numerical data presented and analyzed in this volume comes from a variety of different sources with varying levels of precision in the data. For presentation purposes, the following general rounding rules were applied: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10. Each value, including the totals and sub-totals, was independently rounded directly from the underlying source data. However, because totals and sub-totals were independently rounded they may not be the sum of the other constituent lower level table values.

threat(s) to support issuance of a proposed rule to list but issuance of the proposed rule is precluded" (75 FR 69222–69294).

Section 9 of the ESA prohibits the take of threatened and endangered wildlife species. "Take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Harass is defined as "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering." Harm is defined as "an act which actually kills or injures wildlife. Such acts may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering." Thus, take can occur as a consequence of the loss of habitat resulting from development, land use activities, and water use, as well as the discretionary programs that permit these activities.

An incidental take permit process under Section 10(a)(1)(B) of the ESA authorizes the taking of federally listed wildlife species if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Section 10(a)(2)(A) of the ESA requires an applicant for an incidental take permit to submit a Habitat Conservation Plan (HCP) that specifies, among other things, the impacts likely to result from the taking, as well as the measures the permit applicant will undertake, to minimize and mitigate such impacts.

Section 7 of the ESA requires federal agencies to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed wildlife or plant species or destroy or adversely modify their critical habitat. When a federal agency action, such as issuance of a permit or grant of right-of-way, may adversely affect a federally listed species, the federal agency initiates formal consultation with the USFWS. Consultation results in a biological opinion in which the USFWS determines whether the proposed action is likely to jeopardize the continued existence of a listed species or result in destruction or adverse modification of designated critical habitat for a species. If the determination is affirmative, the USFWS recommends reasonable and prudent alternatives to the proposed action, if any are identifiable, that would reduce the level of impact on no jeopardy/no adverse modification of critical habitat. As appropriate, a biological opinion includes an incidental take statement that exempts the anticipated level of incidental take resulting from the activities evaluated in the biological opinion from Section 9 take prohibition.

Migratory Bird Treaty Act. The Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. 703-712), is the domestic law that affirms, or implements, the United States' commitment to four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. Each of the conventions protect selected species of birds common to both countries (that is, they occur in both countries at some point

during their annual life cycle). The MBTA protects migratory birds and their nests, eggs, young, and parts from possession, sale, purchase, barter, transport, import, export, and take. For purposes of the MBTA, take is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect" (50 CFR 10.12). It is a strict liability statute wherein proof of intent is not an element of a taking violation. The MBTA applies to migratory birds identified in 50 Code Federal Regulations (CFR) 10.13. Generally speaking, the MBTA protects all birds occurring in the United States except for house (English) sparrow (*Passer domesticus*), European starlings (*Sturnus vulgaris*), rock doves (pigeons; *Columba livia*), any recently listed unprotected species in the *Federal Register*, and nonmigratory upland game birds. The USFWS implements and enforces the MBTA. For species listed under both the ESA and MBTA, USFWS has the authority to authorize incidental take with special terms and conditions under Section 10(a)(1)(B) of the ESA and have this permit also serve as a Special Purpose Permit under 50 CFR 21.27 of the MBTA. Special Purpose Permits are required in the event that an action would take, possess, or involve the sale or transport of birds protected by the MBTA. The DRECP's General Conservation Plan (GCP) element would consider the Draft DRECP and EIR/EIS when deciding how to incorporate an MBTA Special Purpose Permit into any 10(a)(1)(B) permit for ESA-listed species also protected by the MBTA. If any Section 10(a)(1)(B) permit is issued, any such take would not be in violation of the MBTA.

Bald and Golden Eagle Protection Act of 1940, as Amended. The Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668–668d), enacted in 1940, and as amended, prohibits anyone, without a permit issued by the USFWS, from "taking" bald and golden eagles including their parts, nests, or eggs. The Eagle Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." For purposes of these guidelines, "disturb" means "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

Clean Water Act. The U.S. Army Corps of Engineers regulates the discharge of dredged and/or fill material into waters of the United States under Section 404 of the federal Clean Water Act. The term "waters of the United States" is generally defined to include navigable waters as well as other waters (such as streams and seeps) and wetlands that meet applicable regulatory criteria.

Executive Order 11990 Protection of Wetlands. The basic requirement of Executive Order 11990 is that federal agencies avoid construction or management practices that would adversely affect wetlands unless that agency finds that (1) there is no practicable alternative, and (2) the proposed action includes all practicable measures to minimize

harm to the wetlands. Executive Order 11990 directs all federal agencies to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance the natural beneficial values of wetlands in the conduct of the agency's responsibilities for (1) acquiring, managing, and disposing of federal lands and facilities; (2) providing federally undertaken, financed, or assisted construction and improvements; and (3) conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

Fish and Wildlife Coordination Act. The Fish and Wildlife Coordination Act authorizes the secretaries of Agriculture and Commerce to provide assistance to and cooperate with federal and state agencies to protect, rear, stock, and increase the supply of game and fur-bearing animals, as well as to study the effects of domestic sewage, trade wastes, and other polluting substances on wildlife. The act also directs the Bureau of Fisheries to use impounded waters for fish-culture stations and migratory-bird resting and nesting areas and requires consultation with the Bureau of Fisheries prior to the construction of any new dams to provide for fish migration. In addition, this act authorizes the preparation of plans to protect wildlife resources, the completion of wildlife surveys on public lands, and the acceptance by the federal agencies of funds or lands for related purposes provided that land donations received the consent of the state in which they are located.

The amendments enacted in 1946 require consultation with the USFWS and the fish and wildlife agencies of states where the "waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted . . . or otherwise controlled or modified" by any agency under a federal permit or license. Consultation is to be undertaken for the purpose of "preventing loss of and damage to wildlife resources." The amendments authorize the transfer of funds to the USFWS to conduct related investigations. Land made available to the Secretary of Interior for wildlife protection purposes is to be managed directly by or under cooperative agreements with the Secretary of Interior. General plans may also include the transfer of project lands to a state for management. The amendments authorized appropriations for related purposes. The amendments also titled the law as the Fish and Wildlife Coordination Act and expanded the instances in which diversions or modifications to water bodies require consultation with USFWS. These amendments permitted lands valuable to the Migratory Bird Management Program to be made available to the state agency exercising control over wildlife resources.

Bureau of Land Management Policy. Section I.2.1 describes the Federal Land Policy and Management Act and the associated California Desert Conservation Area Plan (CDCA). The Bureau of Land Management (BLM) also manages special-status species in accordance with *Manual 6840, Special-Status Species Management.* The manual establishes policy to manage species listed or proposed for listing pursuant to the ESA and BLM Special-Status Species which are found on BLM-administered lands. The BLM special-status species policy aims to

conserve and/or recover listed species and their habitats and to initiate proactive conservation measures that reduce or eliminate threats to BLM Special-Status Species to prevent them from requiring listing in the future (BLM 2008). A supplement to this manual, *BLM Manual Handbook 6840-1 Special Status Plant Management,* focuses on management of BLM Special-Status plants. It includes details on survey coverage methods, in relation to likelihood of species occurring and intensity of impact that should guide plant surveys on BLM lands. Most of it reflects standardized survey practices for adequate plant surveys. The supplement also provides an overview of qualitative monitoring (e.g., photoplots) and quantitative monitoring (e.g., transects), but refers to *BLM Technical Reference 1730-1, Measuring and Monitoring Plan Populations*, for more detail (BLM 2012).

III.7.2 Physical Conditions

The physical conditions in the DRECP Plan Area, which provide the context for the ecological processes discussion in Section III.7.3, include ecoregions, climate, geomorphology, hydrology, topography, and regional geology and associated processes.

III.7.2.1 Ecoregions

The U.S. Forest Service (USFS) defined ecological sections and subregions (i.e., ecoregions) within California as part of the USFS National Hierarchical Framework adopted by the USFS Ecological Classification and Mapping Task Team (USFS 1997). The DRECP Plan Area is divided into the following ecoregion sections: Colorado Desert, Mojave Desert, Sierra Nevada, Sonoran Desert, and Southern California Mountains and Valleys. These sections are further divided into 33 ecoregional subsections listed in Table 2-1 and shown on Figure 2-1 of the DRECP Baseline Biology Report (Appendix Q). The 33 ecoregional subsections were consolidated into ten ecoregion subareas used for the DRECP.

III.7.2.2 Climate

In the desert regions of the DRECP Plan Area, the climate is generally characterized by hot, dry summers and mild to cold winters. Rainfall events originate from winter frontal storms off the Pacific Ocean and occasional summer convective monsoons, but these sources are variable in different regions of the desert. Winter storms generally bring widespread, longer-duration, low-intensity rainfall, particularly in the western desert regions, whereas summer monsoons generate isolated, short, high-intensity rainfall in the eastern desert regions (Lichvar and McColley 2008). Climatic conditions vary between the Mojave and Colorado/Sonoran deserts, especially with respect to temperature and precipitation. Annual precipitation ranges from approximately 3 inches in the low deserts (such as the Colorado/Sonoran) to approximately 8 inches in the high deserts and desert ranges (such as the Mojave) while annual temperature ranges from approximately 60 to 75 degrees Fahrenheit (°F) in the low deserts to approximately 45°F to 77°F in the high deserts and

desert ranges (USFS 1997). Climate in the DRECP Plan Area is discussed in greater detail in Chapter III.3, Meteorology and Climate Change. See also the introduction to the ecological context of the DRECP Plan Area (Section III.7.4) for a discussion of the influence of climate on ecological conditions.

III.7.2.3 Geomorphology

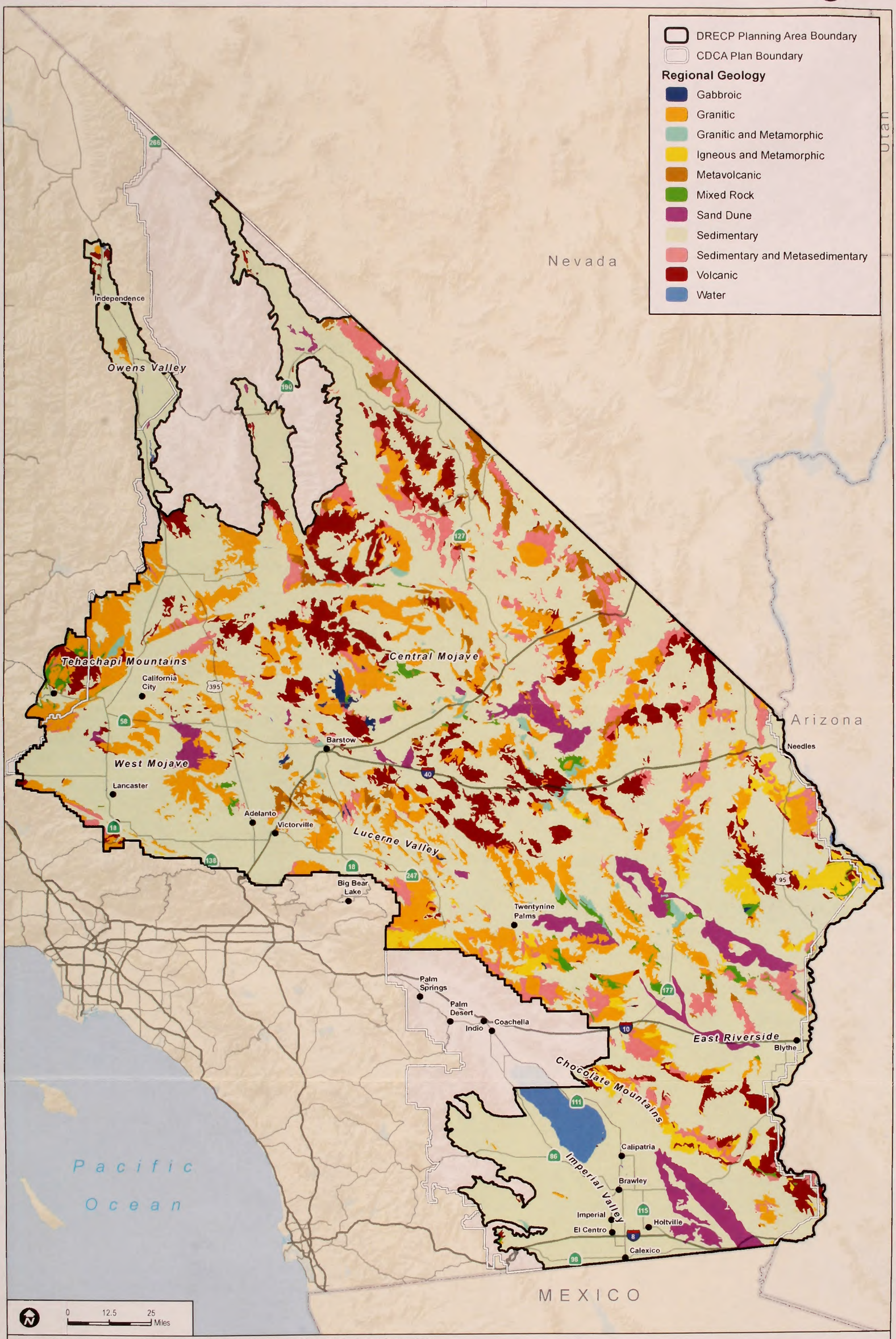
Geomorphology refers to the landforms and relief patterns of the Earth's surface. Although the DRECP Plan Area extends into the San Bernardino and Western Transverse Mountain ranges and the Sierra Nevada Mountain range in the north, the vast majority of the DRECP Plan Area is in the Mojave and Colorado/Sonoran desert regions of California. Therefore, this discussion focuses on the geomorphology of the desert regions of the DRECP Plan Area.

The Mojave Desert is bounded on the west by the Sierra Nevada, Tehachapi, San Bernardino, and San Gabriel mountain ranges, and the Colorado/Sonoran Desert portion of the DRECP Plan Area is bounded on the west by the Peninsular Ranges and on the east by the Colorado River. These large mountain ranges create a rain-shadow effect that developed the arid desert regions. The geomorphology of the Mojave and Colorado/Sonoran Desert regions is dominated by short, isolated mountain ranges within desert plains. Major landforms include canyons, mountain tops and ridges, open slopes, and plains as summarized in Table III.7-1. These major landforms are related to regional geology as summarized in Section III.7.2.6 and illustrated in Figure III.7-1.

Table III.7-1
Landforms within the DRECP Plan Area

Landform	Total in the DRECP Plan Area
Canyons, Deeply Incised Streams	1,153,000
Mountain Tops, High Ridges	1,301,000
Open Slopes	3,647,000
Plains	16,484,000
Total	**22,585,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.



Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); CA Geological Survey (2011)

FIGURE III.7-1

Regional Geology

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At least 65 named mountain ranges exist in the DRECP Plan Area. Alluvial fans, which are fan-shaped landforms that form along the base of a mountain front by the buildup of stream sediments and debris flows, are associated with many of these mountain ranges (Harden 2004). Large, coalescing alluvial fans contain numerous washes called "bajadas." The intermountain areas are characterized by numerous playas and basins that form dry lakes. There are approximately 16 named dune systems (Pavlik 1985) and many other smaller dunes and sand formations in the DRECP Plan Area. Among the largest dunes in the DRECP Plan Area are the Algodones Dunes in the Colorado/Sonoran Desert and the Kelso Dunes in the Mojave Desert.

III.7.2.4 Hydrology

The DRECP Plan Area primarily includes two major hydrologic regions: the South Lahontan Hydrologic Region and the Colorado River Hydrologic Region (DWR 2003). The South Lahontan Hydrologic Region generally encompasses the Mojave Desert, East of Sierra Nevada, Sierra Nevada, and the northern flanks of the San Gabriel and San Bernardino mountain ranges. The Colorado River Hydrologic Region encompasses the Sonoran Desert and eastern flank of the Peninsular Range.

Slope debris (i.e., rockslides and rockfalls), alluvial fans, playas, and basins are primarily formed from the forces of running water (see discussion of regional geology and processes in Section III.7.2.6). Substantial surface waters and flows are extremely scarce and unpredictable in arid desert climates. Stream channels are typically ephemeral and formed by flash-flood events, especially during the monsoon season in the Sonoran Desert portion of the DRECP Plan Area. Typical channel forms in the desert regions include alluvial fans, compound (braided) channels, discontinuous ephemeral channels, and single-thread channels with floodplains (Lichvar and McColley 2008). Anthropogenic modifications to DRECP Plan Area hydrology from urbanization and water conveyance and storage are described in Chapter III.5, Flood Hazard, Hydrology, and Drainage Areas.

The DRECP Plan Area spans all or portions of 52 watersheds (see Table III.7-2 and Figure III.7-2).

Table III.7-2
Watersheds in the DRECP Plan Area

Watersheds		
Amargosa	East Salton	Mesquite
Amos-Ogilby	Emerson	Mojave
Antelope	Fremont	Owens
Anza-Borrego	Goldstone	Owlshead
Ballarat	Granite	Pahrump

Table III.7-2
Watersheds in the DRECP Plan Area

Watersheds		
Bessemer	Grapevine	Rice
Bicycle	Hayfield	Route Sixty Six
Broadwell	Homer	Salton Sea
Cadiz	Imperial	Santa Ana River
Chemehuevis	Indian Wells	Santa Clara – Calleguas
Chuckwalla	Ivanpah	Superior
Clark	Johnson	Trona
Colorado	Joshua Tree	Ward
Coso	Kern River	West Salton
Coyote	Lavic	Whitewater
Cuddeback	Leach	Yuma
Dale	Lucerne Lake	—
Deadman	Means	—

Source: DWR 2004.

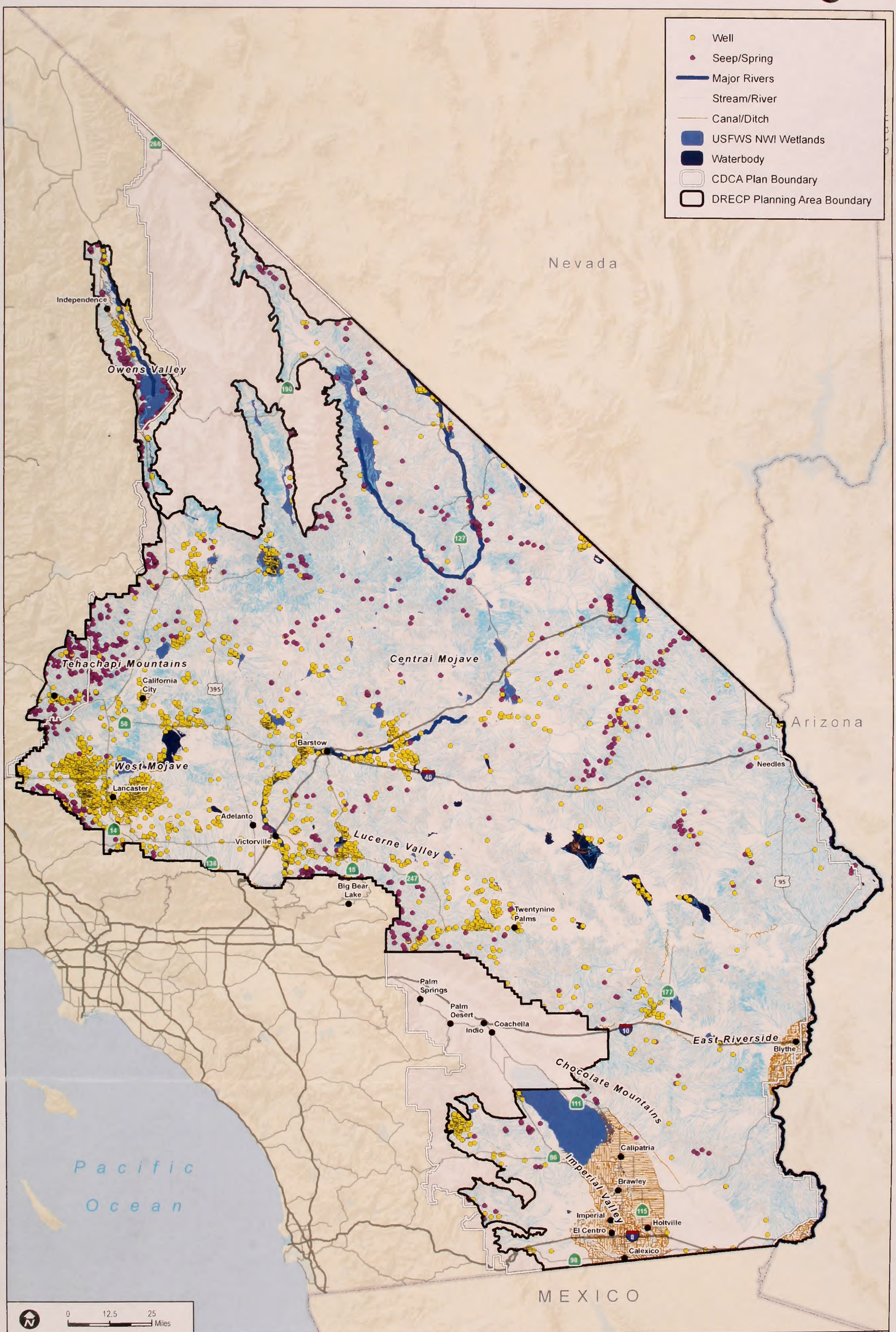
Major hydrologic features in the DRECP Plan Area include the Lower Colorado River, Salton Sea, Owens River, Owens Lake, Mojave River, and Amargosa River. Table III.7-3 provides the linear feet of the four major rivers in the DRECP Plan Area as identified by National Hydrology Dataset (NHD).

Table III.7-3
Major Rivers in the DRECP Plan Area

NHD Major Rivers	Length (feet)
Amargosa River	732,000
Colorado River	405,000
Mojave River	566,000
Owens River	390,000
Total	**2,094,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

A large portion of hydrologically formed features in the DRECP Plan Area is comprised of ephemeral channels and their distributary networks. These and all other water features are described in the Flood Hazard, Hydrology, and Drainage chapter, in Section III.5.4.



Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); DWR (2004); USGS (2013)

FIGURE III.7-2
Hydrology

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As mentioned previously, the DRECP Plan Area is divided into the South Lahontan Hydrologic Region and the Colorado River Hydrologic Region. The South Coast and Tulare Lake hydrologic regions account for less than 1% of the DRECP Plan Area (DWR 2003).

There are several waterbodies identified by the NHD in the DRECP Plan Area, including lakes/ponds, playas, reservoirs, and swamps/marshes. Table III.7-4 provides a summary of the number of these waterbodies in the DRECP Plan Area.

Table III.7-4
National Hydrology Dataset Waterbodies in the DRECP Plan Area

NHD Waterbody	Acres
Lake/pond	100
Intermittent lake/pond	11,000
Perennial lake/pond	206,000
Playa	399,000
Reservoir	18,000
Swamp/marsh	5,000
Total	**639,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

There are numerous springs/seeps in the DRECP Plan Area where groundwater surfaces through cracks and fissures. Higher concentrations of springs/seeps occur in the Sierra Nevada and Northern Transverse ranges, along the edges of the San Bernardino National Forest, and in a section of the Mojave National Preserve (Figure III.7-2) (USGS 2010). Table III.7-5 provides the number of seeps/springs in the DRECP Plan Area by ecoregion subarea.

Table III.7-5
Seeps/Springs in the DRECP Plan Area by Ecoregion Subarea

Ecoregion Subarea	Count of Seeps/Springs
Cadiz Valley and Chocolate Mountains	12
Imperial Borrego Valley	34
Kingston and Funeral Mountains	119
Mojave and Silurian Valley	60
Owens River Valley	130
Panamint Death Valley	172
Pinto Lucerne Valley and Eastern Slopes	144
Piute Valley and Sacramento Mountains	26

Table III.7-5
Seeps/Springs in the DRECP Plan Area by Ecoregion Subarea

Ecoregion Subarea	Count of Seeps/Springs
Providence and Bullion Mountains	80
West Mojave and Eastern Slopes	294
Total	**1,071**

There are approximately 606,071 acres of wetlands identified by the National Wetlands Inventory in the DRECP Plan Area (see Appendix Q, Table 2-3). Wetland types include freshwater emergent wetland, freshwater forested/shrub wetland, freshwater pond, lake, and riverine. Larger wetland areas occur at the Salton Sea and in the northern portion of the DRECP Plan Area (Figure III.7-2).

III.7.2.5 Topography

The DRECP Plan Area ranges in elevation from below sea level to approximately 8,700 feet above mean sea level (AMSL). The majority of the DRECP Plan Area is at the middle elevation range of approximately 1,500 to 3,500 feet AMSL. A large portion of the DRECP Plan Area is relatively flat as opposed to moderately sloped or steep. The flattest areas of the DRECP Plan Area include the Mojave Desert's High Desert Plains and Hills and the Colorado/Sonoran Desert. The DRECP Plan Area supports a relatively even distribution of aspects. See Section III.7.3.1 for additional information regarding the topography of the DRECP Plan Area.

III.7.2.6 Regional Geology and Processes

Regional geology is an important factor in soil hydrology and hence in the type and distribution of local desert vegetation types and associated ecological processes. Generally, soil structure strongly affects root distribution, which relates to aboveground plant size/biomass and productivity (Fenstermaker et al. 2009).

Table III.7-6 summarizes the regional geology of the DRECP Plan Area by parent material; Table III.7-7 summarizes the distribution of mapped dunes and sand resources in the DRECP Plan Area by ecoregion subarea. Additional finer-scale Aeolian mapping was conducted by the California Department of Conservation (2014) in the following four locations: Johnson Valley, East Riverside, San Felipe Dunes, and Imperial Dunes. Regional geology of the DRECP Plan Area is also shown on Figure III.7-1.

Table III.7-6
Regional Geology in the DRECP Plan Area

Parent Material	Acres
Gabbroic	44,000
Granitic	2,853,000
Granitic and metamorphic	110,000
Igneous and metamorphic	438,000
Metavolcanic	367,000
Mixed rock	190,000
Sand dune	707,000
Sedimentary	14,893,000
Sedimentary and metasedimentary	1,147,000
Volcanic	1,621,000
Water	213,000
Total	**22,585,000**

Source: California Department of Conservation 2010.
Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Table III.7-7
Dunes and Sand Resources by Ecoregion Subarea

Ecoregion Subarea	Total in the DRECP Plan Area
Cadiz Valley and Chocolate Mountains[1]	598,000
Imperial Borrego Valley[1]	255,000
Kingston and Funeral Mountains	69,000
Mojave and Silurian Valley	232,000
Owens River Valley	8,000
Panamint Death Valley	140,000
Pinto Lucerne Valley and Eastern Slopes[1]	87,000
Piute Valley and Sacramento Mountains	90
Providence and Bullion Mountains	269,000
West Mojave and Eastern Slopes	122,000
Total	**1,781,000**

Source: California Department of Conservation 2000; Dean 1978; and CDFG 2012a.
Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

[1] Additional finer-scale Aeolian mapping was conducted in the Cadiz Valley and Chocolate Mountains' Imperial Borrego Valley, as well as Pinto Lucerne Valley and Eastern Slopes subareas, and is described in detail in the *Eolian System Mapping Report* (California Department of Conservation 2014).

The majority of the DRECP Plan Area is composed of alluvium, which is unconsolidated sediment deposited by streams. Alluvium makes up 61% of the DRECP Plan Area, though it is more common in the desert regions. In more mountainous areas, alluvium makes up a relatively small portion of the DRECP Plan Area.

The other most common geological components in the Mojave Desert are granite substrates (coarse-grained intrusive rock consisting mainly of light silicate minerals), which make up 13% of the area, and volcanic/metavolcanic rocks, which make up 9% of the area. The DRECP Plan Area contains several relatively young (i.e., within the last million years) volcanic features in the Mojave and Sonoran deserts, including the Cima, Amboy-Pigash, and Turtle Mountain features in San Bernardino County, Pinto Basin-Salton Creek in Riverside County, and Obsidian Buttes in Imperial County, as well as several smaller miscellaneous volcanic features in San Bernardino, Inyo, and Imperial counties (Harden 2004). Sand dune and marine depositions make up relatively small portions of the DRECP Plan Area, but they still account for substantial acreages in the Mojave and Colorado/Sonoran deserts. Sand dune deposits make up about 2% of the Mojave Desert and about 7% of the Colorado/Sonoran Desert. Marine deposits are a relatively small portion of the DRECP Plan Area, making up just over 7% of the Mojave Desert and about 4% to 5% of the Colorado/Sonoran Desert (including the Salton Sea).

Miller et al. (2009) identify three fundamental geomorphic processes that shape the regional geology of desert systems and transportation and deposition of substrates: (1) Aeolian (wind-transported); (2) fluvial, alluvial, and lacustrine (water-transported); and (3) mass-wasting (gravity-transported). Miller et al. (2009) also outline the relationship between substrate deposit types and depositional process: alluvial fans are formed through fluvial and debris flow processes; Aeolian dunes and sheets are formed through Aeolian processes; playas and axial valley washes are formed through fluvial, lacustrine, and Aeolian processes; hillslope materials are formed through mass-wasting; and wetland deposits are formed through fluvial and Aeolian processes. Surficial deposits vary on several factors related to these depositional processes, including particle size, cohesiveness, bulk density, lateral and vertical heterogeneity, degree of sorting, time since the deposit was abandoned (or isolated), and the relative increase in soil development and erosion that occurs with time after abandonment (Miller et al. 2009; Short and Lancaster 2015). The surficial deposit's depositional setting is strongly correlated with the particle size and geomorphic signature (Short and Lancaster 2015). These geomorphic processes are common to both the Mojave Desert and Colorado/Sonoran Desert in the DRECP Plan Area.

III.7.2.6.1 Aeolian Processes

Wind systems are particularly important in arid and semiarid environments where sparse vegetation enables wind energy to more directly affect the soil surface (Breshears et al. 2003). The deposition of Aeolian sediments is one of the major processes that shape the desert landscape, including desert pavement and dune systems (BLM 2002; Miller et al. 2009).

Aeolian systems are determined by the interactions of three main factors: sediment supply, sediment availability (i.e., its ability to be transported by the wind), and the transport capacity of the wind (Kocurek and Lancaster 1999). Miller et al. (2009) describe Aeolian-driven soil formation, or pedogenesis, as a process that "proceeds by progressive infiltration of fine-grained aeolian materials (dust), chemical deposition, and weathering within sediment deposits" (p. 232). This process results in a soil layering or "horizonization" that strongly affects soil permeability and moisture-holding capacity and becomes more pronounced over time. Aeolian processes facilitate the formation of desert pavements, which are closely packed rock surface substrates created through wind and water erosion that generally have very low permeability and moisture available to plants (Miller et al. 2009). Increased runoff from these soils can also promote erosion and surface drainages and dissects the soil deposits (Miller et al. 2009).

Sand dune systems form where winds are consistently strong enough to lift and carry fine sand grains and where there is little or no vegetation that serves to stabilize the soil (Harden 2004). Sandy alluvium in dry washes and alluvial fans are the sources for these materials, and strong winds generally blowing east to west transport the sands to areas where the winds decrease at the mountain front and deposit the sand (Harden 2004). The Algodones Dunes in the Colorado/Sonoran Desert of the southeastern portion of the DRECP Plan Area, for example, formed from the sandy delta of the Colorado River and currently extend about 43 miles from the southwest portion of the Salton Sea to the Mexican border and reach heights of over 300 feet.

In relation to Aeolian processes, sand dune regional geology is described and mapped in Section III.7.2.6, and dune vegetation types are described and mapped in Section III.7.4.2.6.

III.7.2.6.2 Fluvial, Alluvial, and Lacustrine Processes

As described previously, the majority of the regional geology of the Mojave and Colorado/Sonoran deserts and East of Sierra Nevada is alluvium that has resulted from fluvial processes and over geological time scales that deposit materials (i.e., alluviation) from the mountains to the alluvial fans at the base of the mountains. Desert fluvial processes generally relate to the drainage system of slopes and channels. Although these processes are generally considered to occur over long periods of time, severe flooding events related to thunderstorms can cause alluvial fan flash flooding and large debris flows

that can alter the landscape over very short time periods. Generally, the size of an alluvial fan is proportional to the size of the drainage network for the fan (Harden 2004).

Lacustrine processes are most prominent in desert dry lakes or playas, which generally are low spots in drainage basins that capture sediments and surface water, and which may also be influenced by groundwater; technically such areas are base-level plains in desert drainage basins (Cooke and Warren 1973). Several prominent playas and basins that form dry lakes are present in the DRECP Plan Area, such as Harper Dry Lake, Lucerne Dry Lake, El Mirage Dry Lake, Ivanpah Dry Lake, Bristol Dry Lake, and Silurian Dry Lake. Playas are characterized by large flat areas dominated by fine-grained sediments. Due to the fine-grained sediments, playas are relatively impermeable. Surface water is removed by infiltration and evaporation, and groundwater is removed by evaporation and evapotranspiration (evaporation and transpiration by vegetation). During wet periods, surface water may accumulate, facilitating lacustrine sedimentation. Overall, the hydrologic characteristics of a playa are affected by climate, basin floor conditions, soil and vegetation, and water salinity (which affects evaporation rates).

III.7.2.6.3 Mass-Wasting Processes

Mass-wasting refers to the downslope movement of rock, regolith (rock and mineral fragments), and soil under the direct influence of gravity (Lutgens and Tarbuck 1992). Mass-wasting processes include creep, slides, and debris flows. Slides are sudden downslope movements of rocks and sediments. Debris flows are dense, fluid mixtures of rock, sediments, and water. Mass-wasting in the many major and smaller mountain ranges in the DRECP Plan Area occurs primarily as rock falls and rock slides on the steeper slopes. Intense monsoonal rains and earthquakes are likely primary causes of rockfalls and rockslides on steep, mountain slopes in the DRECP Plan Area. Creep, on the other hand, is a slow, continuous downslope movement primarily related to freeze/thaw or wet/dry cycles (Lutgens and Tarbuck 1992; California Department of Conservation 2007).

III.7.3 Ecological Processes

This section describes how the physical factors discussed in Section III.7.2 and associated ecological processes influence biological resources in the DRECP Plan Area. The ecological processes discussed in this section are associated with environmental gradients, substrates and Aeolian and fluvial/alluvial transport, soil biota, carbon and nutrient cycling, and fire.

III.7.3.1 Environmental Gradients

An environmental gradient is a spatial shift in physical and ecological parameters across a landscape, such as changes in topography, climate, land cover types, or vegetation types. Generally, the vegetation types and patterns in the desert regions are directly related to the

physical features and processes described in Section III.7.2, which create the range of environmental gradients in the DRECP Plan Area, including flat, relatively barren playas and basins, alluvial fans and bajadas, and the rocky slopes and ridgelines of the numerous mountain ranges. Environmental gradients are influenced by factors such as temperature, precipitation, wind, and solar exposure that vary with physical factors such as elevation, latitude, slope, and aspect. For example, the hotter, drier, and flatter desert lowlands in the DRECP Plan Area, such as the Colorado/Sonoran Desert, are associated with relatively low plant species richness and diversity and are dominated by low, shrubby species such as creosote (*Larrea tridentata*) and burro-weed (*Ambrosia dumosa*) (Baldwin et al. 2002, as cited in Appendix Q). As elevation and precipitation increases, in the Mojave, for example, vegetation types include more woody species, such as Joshua tree and conifers such as pinyon pines (*Pinus* spp.) and junipers (*Juniperus* spp.). The composition of desert vegetation also varies with seasonal precipitation patterns. Most herbaceous annuals germinate and bloom in association with winter rains, but some species respond to ephemeral summer rains (Baldwin et al. 2002, as cited in Appendix Q). A discussion of the vegetation types in the DRECP Plan Area is provided in Section III.7.4. Insolation is defined as incident solar radiation and corresponds to the amount of solar resource available per unit area. It is usually expressed as kilowatt-hours per square foot per day and can be summed over an area to give an estimate of the gross energy potential in that area. The DRECP Plan Area has very high insolation values ranging from between 7 and 7.5 kilowatt-hours per square meters per day (kwhrs/m^2-day) (CEC 2005).

As discussed in Section III.7.2, the DRECP Plan Area ranges in elevation from below sea level to approximately 8,700 feet AMSL. Table III.7-8 shows the distribution of elevation ranges in the DRECP Plan Area.

Table III.7-8
Distribution of Elevation Ranges in the DRECP Plan Area

Elevation Range (feet AMSL)	Acres
Less than 0	1,113,000
0–500	1,781,000
500–1,000	2,307,000
1,000–1,500	2,023,000
1,500–2,000	2,256,000
2,000–2,500	3,338,000
2,500–3,000	3,452,000
3,000–3,500	2,535,000
3,500–4,000	1,786,000
4,000–4,500	1,028,000
4,500–5,000	525,000

Table III.7-8
Distribution of Elevation Ranges in the DRECP Plan Area

Elevation Range (feet AMSL)	Acres
5,000–5,500	268,000
5,500–6,000	111,000
6,000–6,500	38,000
6,500–7,000	15,000
7,000–7,500	7,000
7,500–8,000	2,000
8,000–8,500	300
8,500–8,700	<10
Total	**22,585,000**

Source: USGS 2007.
Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

A large portion of the DRECP Plan Area is relatively gentle terrain as opposed to moderately sloped or steep (Table III.7-9).

Table III.7-9
Distribution of Slope Ranges in the DRECP Plan Area

Slope (degrees)	Acres	% of Total
0–5	13,615,000	60.3%
5–10	3,693,000	16.4%
10–15	1,484,000	6.6%
15–20	994,000	4.4%
20–25	755,000	3.3%
25–30	581,000	2.6%
30–35	442,000	2.0%
35–40	329,000	1.5%
40–45	238,000	1.1%
45–50	165,000	0.7%
50–100	287,000	1.3%
Above 100	1,000	0.01%
Total	**22,585,000**	**100.0%**

Source: USGS 2007.
Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10,

and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

The DRECP Plan Area supports a relatively even distribution of aspects (Table III.7-10).

Table III.7-10
Distribution of Aspect in the DRECP Plan Area

Aspect	Acres	% of Total
Flat	236,000	1.0%
North	2,773,000	12.3%
Northeast	3,386,000	15.0%
East	3,082,000	13.6%
Southeast	2,813,000	12.5%
South	2,730,000	12.1%
Southwest	2,966,000	13.1%
West	2,490,000	11.0%
Northwest	2,111,000	9.3%
Total	**22,585,000**	**100.0%**

Source: USGS 2007.
Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

III.7.3.2 Substrates

Substrate is an important factor in local desert vegetation types and soil hydrology, and it is critical for maintaining native vegetation types. Generally, soil structure strongly affects root distribution, which relates to aboveground plant size/biomass and productivity (Fenstermaker et al. 2009, as cited in Appendix Q). Because desert ecosystems are water-limited, the relationship between precipitation patterns, soil structure, and soil hydrology, therefore, is critical for maintaining a healthy desert ecosystem. The regional geology and processes associated with ecological processes in substrates are described in Section III.7.2.6. Key factors in how substrates influence ecological process include:

- Water infiltration into the upper soil horizon
- Water storage capacity of lower soil horizons
- Nutrient availability for plants
- Direct effects of Aeolian (wind-transported) sand deposition on plants and animals

Several different soil textures occur in the DRECP Plan Area. Unweathered bedrock, very gravelly sandy loam (soil composed of sand, silt, and clay), and loamy sand are the most common soil textures in the DRECP Plan Area. Lower elevation bedrock substrates, for example, support plant species such as brickellbush (*Brickellia arguta*), brittlebush (*Encelia farinosa*), hedgehog cactus (*Echinocereus engelmannii*), and arrow-leaf (*Pleurocoronis pluriseta*). Washes support more deep-rooted shrubs tolerant of flash floods, including catclaw, desert-willow (*Chilopsis linearis*), cheesebush (*Ambrosia salsola*), mesquite (*Prosopis glandulosa*), palo verde (*Cercidium* spp.), ironwood (*Olneya tesota*), and smoke tree (*Psorothamnus spinosus*). Playas, salt flats, and basins where water collects may support highly alkaline or saline conditions unsuitable for plant growth, but the margins of these features support tolerant plants such as saltbushes (*Atriplex* spp.) and greasewood (*Sarcobatus vermiculatus*).

A critical feature of soil hydrology is the infiltrability of the soil, which is the maximum rate water can infiltrate a given soil under atmospheric conditions (Miller et al. 2009, as cited in Appendix Q). Sand deposits increase water infiltration, dilute soil nutrient concentrations, reduce soil surface stability, and restrict water- and nutrient-holding capacity (Belnap et al. 2008, as cited in Appendix Q). Infiltration generally decreases with the increasing age of a soil deposit and degree of soil development. An important characteristic of desert substrates is the formation of desert pavement and accumulation of desert varnish on alluvial piedmonts (i.e., the areas lying at the base of mountains), which occur progressively over a long time period as the soil is stabilized.

Horizonization, which becomes more pronounced with age, strongly affects soil permeability and moisture-holding capacity. The collection of silt and sand in the Av horizon (a distinct, fine-grained soil horizon that forms the topmost mineral layer of soil and has many vesicles or large pores throughout) through Aeolian processes, for example, facilitates the formation of desert pavement, which generally has very low permeability (as little as 1%) and low moisture available to plants. The decreased infiltration in older deposits also contributes to higher runoff rates, which cause erosion and the formation of surface drainages. Generally, in the Eastern Mojave, perennial plant cover decreases with the age of the deposit and formation of desert pavement and varnish (Miller et al. 2009, as cited in Appendix Q).

While development of the Av horizon can decrease infiltration of water, development of the underlying B horizon (i.e., subsoil) can also strongly affect soil hydrology. The accumulation of loam, sandy clay loam, and clay loam in the B horizon enhances soil structure and the number of micropores, which increase the retention and water storage capacity of the soil (Belnap et al. 2008; Miller et al. 2009, as cited in Appendix Q). These finer, clay and loam soils have lower permeability and bind water more tightly to soil particles by capillary force (Miller et al. 2009, as cited in Appendix Q).

In addition to available moisture related to soil structure, plant species composition is also influenced by the nutrient-rich deposition of fine silt and clay particles that increase soil fertility (Belnap et al. 2008, as cited in Appendix Q). Aeolian dust contributes to the formation of soils and supplies sediments with essential nutrients, including the following elements: phosphorus, magnesium, sodium, potassium, molybdenum, and calcium (Reynolds et al. 2001, as cited in Appendix Q).

In addition to Aeolian-related soil and vegetation interactions that occur over long time periods of soil development, Aeolian processes can have more direct and immediate physical impacts on the ecosystem. Sand deposition that can occur during a single wind event can cause either complete or partial plant burial. Airborne dust that collects and accumulates on leaves and stems of desert plants can cause changes in physiological performance. Sharifi et al. (1997) measured physiological parameters of gas exchange in creosote bush, cheesebush, and four-winged saltbush (*Atriplex canescens*) at a Mojave Desert site where plants were both undisturbed and heavily dusted. They found that maximum rates of photosynthesis of dusted plants compared to undisturbed controls were reduced 21% in the resinous leaflets of creosote bush, 44% in resinous leaves and photosynthetic stems of cheesebush, and 58% in non-resinous (C_4) leaves of four-winged saltbush. They also found that dusted plants of all three species showed reduced maximum leaf conductance, transpiration, and instantaneous water-use efficiency, as well as other physiological effects and morphological effects (smaller leaf areas and greater leaf-specific masses) indicating that dust-related reduced photosynthesis and decreased water-use efficiency may cause lowered primary production in desert plants when photosynthesis is occurring. The deposition of Aeolian sand has also been documented to enhance coppice dune formation in the Johnson Valley (Short and Lancaster 2015).

Sand inputs can also affect, either negatively or positively, the ability of animals to burrow into the soil. Consequently, areas with active Aeolian systems, such as sand dunes, generally include plant and animal species able to adapt to rapid changes in substrate (Belnap et al. 2008, as cited in Appendix Q).

Dynamic alluvial and fluvial processes also play an important role in determining vegetation types in an area. Bedford et al. (2009) suggest a "soil-mosaic" approach to understanding how vegetation responds to soil and hydrologic characteristics that determine soil texture, structure, infiltration capacity, and rates of evapotranspiration. They applied the soil-mosaic approach to the size and density of creosote bush, with the hypothesis that soil type and topography are important drivers of these characteristics due to their influence on soil water. Generally Bedford et al. (2009) found that soil texture, elevation, and hydraulic properties related to regional geology influence creosote bush size and density with larger shrubs and denser areas associated with well-drained gravelly soils.

Although plant and animal community types and distributions are strongly determined by the physical processes discussed above, plant and animals also exert an influence on soil development, structure, and hydrologic and chemical properties such as infiltrability, organic material, and chemical nutrients through the mixing of sediment by burrowing, feeding, or other activities resulting from plant rooting and burrowing by insects, rodents, and reptiles. Titus et al. (2002, as cited in Appendix Q), for example, found that microsites with perennial shrubs in a creosote–burro-weed vegetation type in the Mojave Desert and small mammal burrows had higher levels of soil nutrients, and nonvegetated sites (washes, plant interspaces) without burrows had very low levels of nitrogen and phosphorus.

III.7.3.3 Soil Biota

Soil biota is another important factor in desert ecosystem processes. Soil surface biota or biological soil crusts are related to soil stabilization, nutrient cycling, and local hydrology. Biological soil crusts consist primarily of cyanobacteria in the Mojave Desert (Belnap et al. 2008) and Sonoran Desert (Organ Pipe Cactus National Monument in Arizona) (Nagy et al. 2005), which cover most soil surfaces. Cyanobacteria are typically the first colonizers of desert soil crusts (Belnap 2001; Garcia-Pichel et al. 2001), except soils with low pH (Garcia-Pichel et al. 2001). Soil surfaces at higher elevations also support lichens and mosses. Biological soil crusts serve important soil stabilization functions that influence biological resources, including (1) aggregating soil particles and reducing their susceptibility to wind and water erosion, (2) roughing the soil surface, which traps dust and increases capture of mineral nutrients, and (3) enhancing retention of wind- and waterborne organic material and seeds. Subsurface soil biota includes bacteria, fungi, protozoa, nematodes, and microarthropods. An important function of subsurface biota is the breakdown of plant litter and roots, which makes the nutrients of these materials available to other plant and animal organisms (Belnap et al. 2008, as cited in Appendix Q). Mycorrhizal fungi (fungi associated with vascular plant roots) colonize the roots of many desert plants and help collect water, nitrogen, phosphorous, and zinc that can be used by the plant due to their spreading into soil zones out of reach of the plants (Belnap et al. 2008). Winding of the fungi hyphae (long, branching filamentous structure) throughout the soil also contributes to soil stability (Belnap et al. 2008).

III.7.3.4 Carbon and Nutrient Cycling

Carbon and nutrient cycling are important factors in desert ecosystems. Carbon cycling in desert systems occurs from dead plant material, with aboveground decomposition likely occurring from abiotic process (e.g., release of gas when soils are wetted) and belowground decomposition occurring from the biotic process of respiration by plant roots and soil organisms (Belnap et al. 2008, as cited in Appendix Q). Biological crusts can be significant sources of carbon in arid and semiarid environments, especially in areas between vascular

plant species where biological soil crusts can reach 100% cover. In addition, soil organisms, which are sources of carbon for other organisms, are relatively more diverse and abundant in soils with a biological crust than soils without a biological crust.

Dryland ecosystems, which include the deserts of the southwestern United States, account for about 47% of all earth land covers (Lal 2004). However, drylands have relatively low soil organic carbon (SOC) concentrations, accounting for 15.5% of the world's total SOC (Lal 2004). Drylands also contain as much or more soil inorganic carbon (SIC) as SOC. Caliche (a hardpan soil layer common in deserts) is a carbonate accumulation from carbon-rich moisture, accounting for much of SIC. While drylands naturally support relatively low SOC concentrations, maintaining carbon sequestration function in drylands can contribute to controlling enrichment of atmospheric CO_2 (Lal 2004). SOC density in drylands is strongly related to soil characteristics, including being generally coarse-textured with low water, nutrient capacity, and fertility and continually sifted by wind (especially dunes which have significantly lower SOC levels) (Lal 2004). These factors also affect vegetation (which can be patchy and highly variable), run-off patterns, and infiltration rates, which can also affect the distribution and density of SOC. Drylands SOC is affected by human disturbances and climate variation that result in desertification. Disturbances include vegetation removal and soils disturbances related to development activities that can increase carbon emissions and reduce sequestration capacity. Lal (2004) notes that lost carbon can be resequestered through restoration of desertified soils and ecosystems, including afforestation with mesquite and acacia. Recovery of carbon fixation depends on increases in biomass and in the biological crust (Webb et al. 2009).

Nitrogen, which is an essential element for building amino acids and proteins, is made available to desert plants mainly by the cyanobacterium *Nostoc* through the process of nitrogen fixation, which is the reduction of gaseous nitrogen to ammonia or other inorganic or organic compound. Nitrogen fixation is important to plants because the plant itself cannot produce nitrogen. Nitrogen fixation is controlled by moisture and temperature in association with physiological activity by the cyanobacterium (Belnap et al. 2008, as cited in Appendix Q).

Phosphorus, which can be vegetation-limiting in deserts, is made available by the weathering of primary bedrock material such as apatite. Generally, phosphorus is unavailable for uptake by soil biota and plants because of its relative insolubility (due to its reaction with carbonates, iron oxide, and other compounds), but exudates (fluid that filters from the circulatory system) of cyanobacteria, bacteria, fungi, and plant roots can increase phosphorus availability and uptake by dissolving these compounds (Belnap et al. 2008, as cited in Appendix Q).

Other important nutrients affecting plant productivity include potassium, calcium, magnesium, sodium, and micronutrients such as copper, iron, zinc, and manganese.

Potassium, which is essential for plants, is fairly evenly distributed throughout the soil profile in desert regions. Too much calcium can limit plant growth by forming calcium carbonate to the depth of water infiltration (e.g., in playas) and creating a solid layer of calcrete (or caliche, a calcium-rich hardpan) that inhibits plant roots and water flow. Too much calcium can also inhibit the bio-availability of other important nutrients such as phosphorus, magnesium, and micronutrients by reducing their solubility in the soil. Magnesium, which can be depleted fairly rapidly from soils, interacts strongly with other ions such as potassium and sodium, and plant productivity can be affected by the ratio of magnesium to other ions. Sodium is beneficial to plant productivity in small amounts, but because it is the most easily leached cation (positively charged ion) and forms alkaline crusts on the surface, many desert plants have adaptive mechanisms for managing high sodium levels (Belnap et al. 2008, as cited in Appendix Q).

The micronutrients copper, iron, zinc, and manganese are also important to plant productivity but typically have low biologically available concentrations in the arid environments. These micronutrients also react with carbonate compounds, resulting in low solubility and bio-availability (Belnap et al. 2008, as cited in Appendix Q).

III.7.3.5 Fire

Fire has been historically infrequent in the southwestern deserts but has increased in frequency and extent in recent decades, generally as a result of increased fuel provided by the invasion of non-native annual grasses, such as red brome (*Bromus rubens*) and buffelgrass (*Pennisetum ciliare*) (Brooks and Matchett 2006; Abella 2010, as cited in Appendix Q). See Section III.7.7.1 for a discussion of invasive plant species. Most of the fires recorded from 1911 to 2009 within the DRECP Plan Area occurred along its western boundary (CAL FIRE 2009, as cited in Appendix Q). Between 1980 and 1990, about 38 square kilometers (9,390 acres) of the Mojave Desert burned every year (Pavlik 2008, as cited in Appendix Q). Brooks and Minnich (2007, as cited in Appendix Q) indicate that between 1980 and 2001 the Mojave Desert had an annual fire frequency of 2.1 fires per 1,000 square kilometers, the Sonoran had an annual fire frequency of 0.6 fires per 1,000 square kilometers, and the Colorado had an annual fire frequency of 2.2 fires per 1,000 square kilometers. Within the DRECP Plan Area, the largest acreages burned in the years 1999, 2005, 2006, and 2007 (CAL FIRE 2009, as cited in Appendix Q), indicating a trend of increased fire sizes and frequency.

Non-native plant invasions may alter the fire regime by changing the frequency, intensity, extent, type, or seasonality of fire (Brooks and Matchett 2006, as cited in Appendix Q). Repeated fires are typically followed by dominance of bromes (*Bromus* spp., red brome in particular) that can germinate and grow more rapidly on burned sites than many native plants, and that provide fuel loads capable of carrying fire again soon after burning. The

result is a fire regime where increased fire frequency and conversion of native vegetation types to non-native grasses creates a positive feedback loop, setting the stage for even more frequent, intense widespread fires followed by increased conversion of the native landscape (Brooks and Matchett 2006, as cited in Appendix Q).

Increased fire in the desert ecosystem has severe consequences because the vegetation types and desert species were not exposed to frequent and large-scale fires during their evolutionary history and thus are not fire adapted, as are some other vegetation types such as chaparral (Pavlik 2008, as cited in Appendix Q). Landscape changes resulting from altered fire regimes are most evident in the middle elevation shrublands dominated by creosote bush, Joshua tree, and blackbrush (*Coleogyne ramosissima*). Creosote bush, for example, does not stump-sprout after fire like some chaparral species (Pavlik 2008, as cited in Appendix Q). Fire has also decimated large numbers of Joshua trees in areas of Joshua Tree National Park. Fire readily kills Joshua trees and they rarely resprout. In addition, regeneration of Joshua trees often requires protection in the form of shading by existing vegetation or nurse plants for reproduction; thus regeneration of new individuals is slow and depends on the establishment of nurse plants following fire (Abella 2010, as cited in Appendix Q). Compared to other areas of the Mojave Desert, middle elevation shrublands are more susceptible to large fires following years of high rainfall, which causes an increase in the biomass of non-native annual grasses, especially red brome, that produce continuous fuel-beds. Furthermore, native desert annuals do not typically flourish following fire. At lower elevations, the cover of native perennial fuels is naturally very low, so relative to middle elevation shrublands, lower elevation vegetation types are not as sensitive to changes in fire regime related to increases in ephemeral fuels (Brooks and Matchett 2006, as cited in Appendix Q). At higher elevations, native woody fuels dictate fire regimes so fire size does not vary much with rainfall (Brooks and Matchett 2006, as cited in Appendix Q).

Fire functions differently than other forms of disturbance in the desert. Abella (2010, as cited in Appendix Q) found in the Mojave and Colorado/Sonoran deserts that perennial plant cover generally rebounded faster after fire than after land-clearing disturbances related to utility corridors and roads and that post-disturbance species composition differed. Although fire affects soil physical and chemical properties, soils may still remain more intact following fire compared to land-clearing disturbances in which soils are removed or heavily compacted. In addition, roots and seeds may not be entirely removed by fire, but they are often removed after land-clearing disturbances. Thus, residual propagules may contribute to plant reestablishment after fire but not after other types of disturbance (Abella 2010, as cited in Appendix Q). However, fires can sterilize soils by killing mycorrhizal fungi (Pavlik 2008, as cited in Appendix Q).

Some desert wildlife species, such as desert tortoise (*Gopherus agassizii*), are also especially vulnerable to fire because they do not have behavioral avoidance responses to severe events

(e.g., deep burrow systems and quick escape). On the other hand, the effects of fire may be beneficial in certain cases. Early successional vegetation types may provide habitat favorable for some wildlife species, such as Merriam's kangaroo rat (*Dipodomys merriami*), which forages in open areas. Studies have shown increased abundance of this species after a fire in Sonoran Desert upland habitat at Tonto National Forest, Maricopa County, Arizona (Abella 2010, as cited in Appendix Q).

III.7.4 Ecological Context of the DRECP Plan Area

The DRECP Plan Area spans a large geographic area and is primarily composed of the Mojave and Colorado/Sonoran deserts but also includes the surrounding foothill and mountain regions and a small portion of the Great Basin Desert. As described in Section III.7.2.1, these regions of the DRECP Plan Area have been further subdivided up into 10 ecoregion subareas for the purposes of describing the biological resources setting. Following the ecological setting subsections, this section describes the flora, vegetation types, and other land covers in the DRECP Plan Area. Section III.7.5 describes the wildlife resources in the DRECP Plan Area and Section III.7.6.1 provides species summaries for the DRECP proposed Focus Species.

Ecological Setting for the Mojave Desert and Colorado/Sonoran Desert

The Mojave Desert is a "cold" or winter desert, with about 50% to 70% of rainfall occurring during the winter (Redmond 2009). The northern Mojave Desert has the most extreme variations in temperature (including freezing temperatures as low as 0°F at the higher elevations and snowfall), precipitation, and potentially evapotranspiration levels, when compared to the other subregions (Randall et al 2010; Webb et al. 2009). The northern Mojave Desert includes Death Valley, which is the lowest elevation and hottest location in North America; the air temperature here can exceed 130°F in late July and early August at the lowest elevations (Randall et al. 2010). The Sonoran Desert, which includes the low elevation Colorado Desert of Southern California (also referred to as the Colorado/Sonoran Desert), is the hottest of the North American deserts, second only to Death Valley in how little rainfall it receives (ASDM 2012; Weiss and Overpeck 2005). Summer temperatures in the Colorado/Sonoran Desert may exceed 120°F, with surface temperatures of up to 180°F (ASDM 2012). The lower elevations of the Colorado/Sonoran Desert seldom experience sub-freezing temperatures and frost, but snow may fall occasionally at the higher elevations during very cold winter storms.

Rainfall in the northern Mojave Desert is highly variable, including monsoonal precipitation from early July to mid-October averaging 1.4 inches, but with a broad range of 0.02 to 4.9 inches per season (Randall et al. 2010). In contrast to the northern Mojave Desert, the western Mojave Desert has more predictable winter precipitation, accounting for an estimated 82% to 97% of the Mojave Desert's annual rainfall (Webb et al. 2009). The Colorado/Sonoran Desert receives lower annual rainfall than the Mojave despite receiving

summer and winter rains, with an average annual rainfall of 2 inches. In some years, the region may not receive any rainfall at all. Relative humidity levels are also low, often below 10%. Species and individuals in such a harsh environment often have a set of genetic and morphological adaptations that allow their survival.

Harsh or novel environments often occur at the periphery of species' ranges. Individuals surviving in habitat at the edge of a species' distributional range can play an important genetic and geographic role in the survival of the species in the face of environmental fluctuations, such as is likely to be caused by climate change, increasing drought, and habitat fragmentation by a number of human agents. Populations in the Colorado/Sonoran Desert of wide-ranging species such as desert tortoise or bighorn sheep (*Ovis canadensis*), for example, may demonstrate genetic and morphological characteristics distinct from other parts of a species' range. Lesica and Allendorf (1995) suggest two reasons for potential genetic and morphological differences between central and peripheral populations: First, such populations are often at the periphery of a species' range and consequently are often smaller, less dense, and more subject to the effects of genetic drift (change in the frequency of a gene variant (allele) in a population). Second, these populations persist in the harshest range-wide conditions and are consequently adapted to a different environment than present in the rest of the species' range.

Geographically peripheral populations can be subject to stronger selection pressures (pressures shaping evolution) than core populations. Such pressures can result in behavioral and physiological adaptations that facilitate survival in harsher climes (Lesica and Allendorf 1995). These adaptations can confer genetic benefits that contribute to greater survivability of individuals, and ultimately the species, in response to long-term, wide-scale environmental changes. In addition, peripheral populations typically have lower population densities and consequently are more resistant to density-dependent sources of mortality, such as disease. Disease can have population-level impacts, as evidenced by the recent large and range-wide reduction in desert tortoise numbers for certain core (i.e., not peripheral) populations. Other factors, such as human development, can also constrain species to the edges of their historical ranges. In fact, in a study of 245 imperiled species worldwide, Channell and Lomolino (2000) found that 68% of surveyed species retained a greater than expected portion of their distribution in habitat peripheral to the historic range. Given the above, areas supporting peripheral populations can function as refugia against environmental catastrophes and as a source for recolonization of depleted/extirpated core populations of a species (Nielsen et al. 2001; Flannery 2001). Thus, geographically peripheral populations in the Colorado/Sonoran Desert may prove to be just as important for species' long-term survival as larger core populations.

Under current models of climate change, the California deserts are expected to become warmer and may become drier (although some models predict increased precipitation in

the desert regions) as climate change progresses (see Chapter III.3 and Appendix P; also Cayan et al. 2008; Weiss and Overpeck 2005). Species will need to cope with decreasing and less consistent water availability and an increasing number of days above current minimum temperatures. These two abiotic factors are among the primary determinants of species' range (e.g., Bowers and Turner 2001; Leslie and Douglas 1979; Turnage and Hinckley 1938). According to climate change models, conditions currently present in parts of the Colorado/Sonoran Desert are expected to expand to other parts of the DRECP Plan Area (Allen 2012), with an associated shift in vegetation (Notaro et al. 2012). Consequently, the genetic diversity presumably present in populations from the hottest and driest parts of a species' ranges may become increasingly important for ensuring the species' persistence throughout the DRECP Plan Area. Maintaining sufficient connectivity corridors, or linkages, between peripheral and core populations and among core habitat areas will also be essential for conservation of desert wildlife. Maintaining corridors or linkages will also be important to allow the movement of populations of plants and animals to facilitate shifts in species ranges as climate changes occur. See Appendix P for the additional climate change context for the DRECP BLM LUPA.

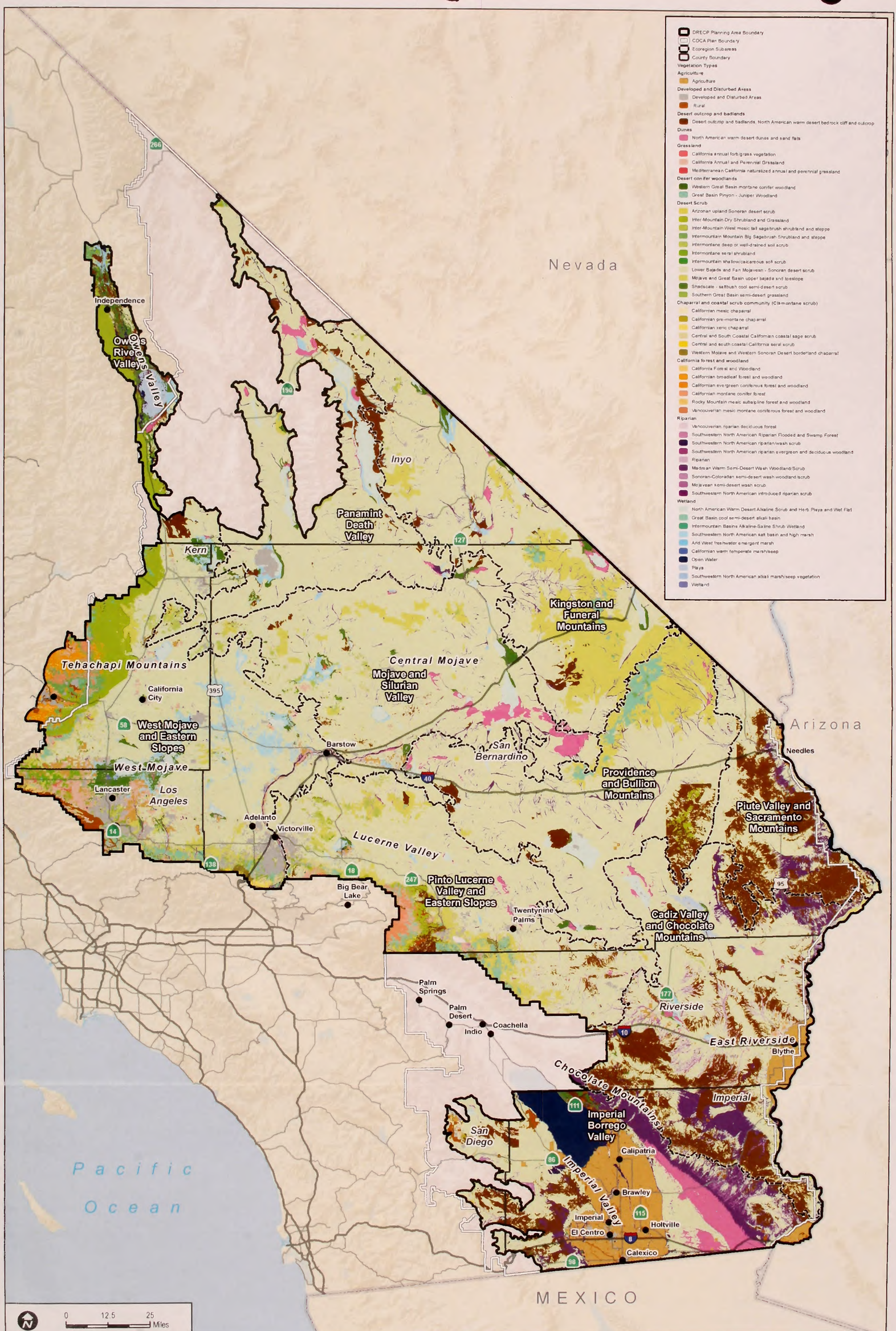
III.7.4.1 Flora, Vegetation Types, and Other Land Covers

III.7.4.1.1 Flora

The California desert flora includes approximately 2,267 plant taxa (species, subspecies, and varieties) native to California, composing about 37% of the total flora in California (Baldwin et al. 2002, as cited in Appendix Q). About 232 taxa (10%) in the California deserts are non-native, which is relatively less than the 15% of California total taxa that are non-native (Baldwin et al. 2002, as cited in Appendix Q). The Mojave Desert in California has about 1,409 native taxa, compared to 1,363 native taxa in the southern Great Basin Province and 709 native taxa in the Colorado/Sonoran Desert (Baldwin et al. 2002, as cited in Appendix Q). The higher level of plant diversity in the Mojave and Great Basin deserts compared to the Colorado/Sonoran Desert reflects the greater climatic and elevation diversity of the Mojave and Great Basin regions.

III.7.4.1.2 Vegetation Types and Other Land Covers

The land cover map for the DRECP Plan Area (Figures III.7-3 through III.7-13) represents a composite of the best available vegetation type and other land cover data for the entire DRECP Plan Area. The land cover map is mapped at fine-scale and medium-scale resolution, which can be used to inform many regional and landscape-scale conservation planning decisions. The land cover map incorporates the current National Vegetation Classification Standard (NVCS) compatible land cover mapping classification and hierarchy.



Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2014); USFWS (2013)

FIGURE III.7-3

Vegetation Types and Other Land Covers - Ecoregion Subarea Index Map

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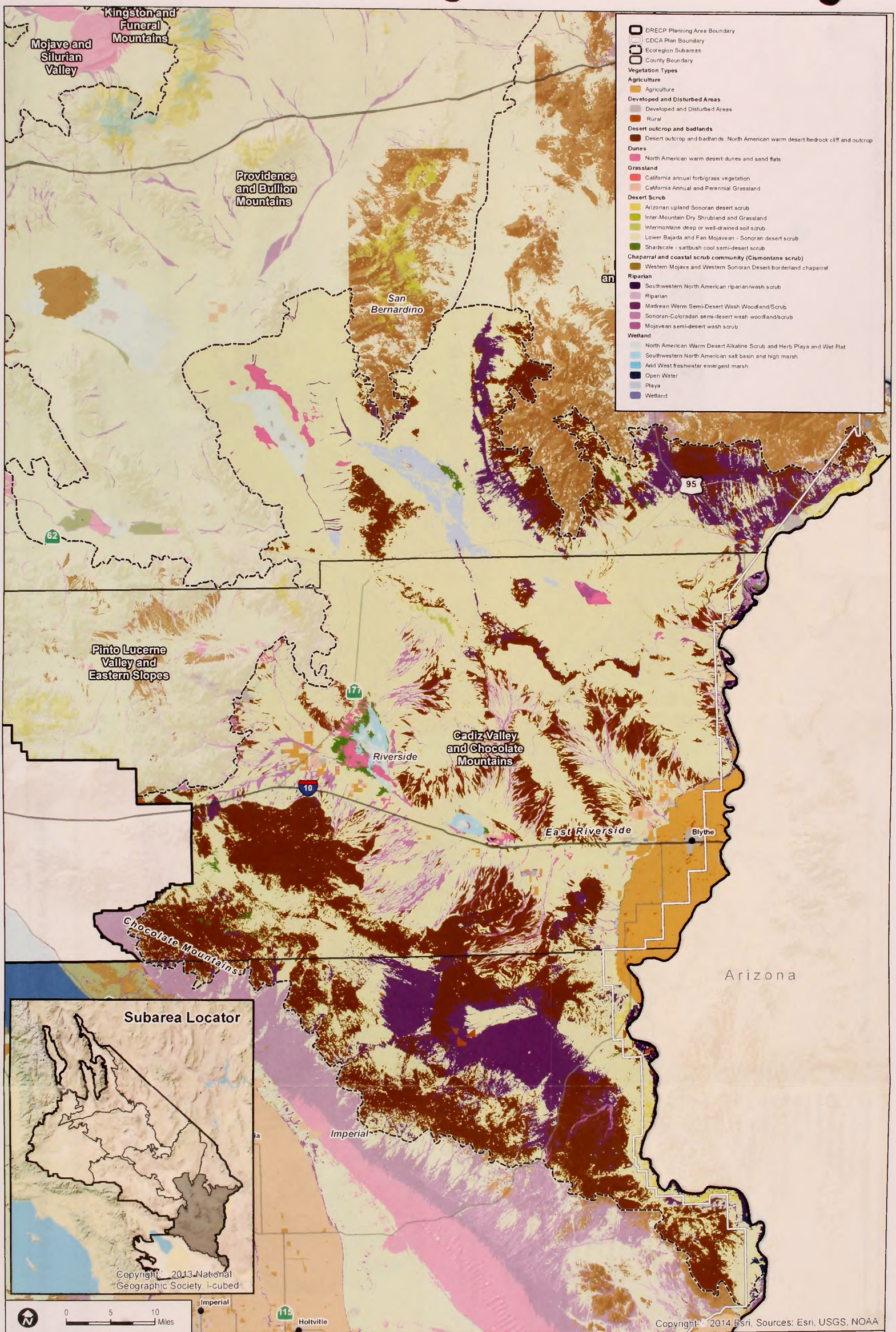
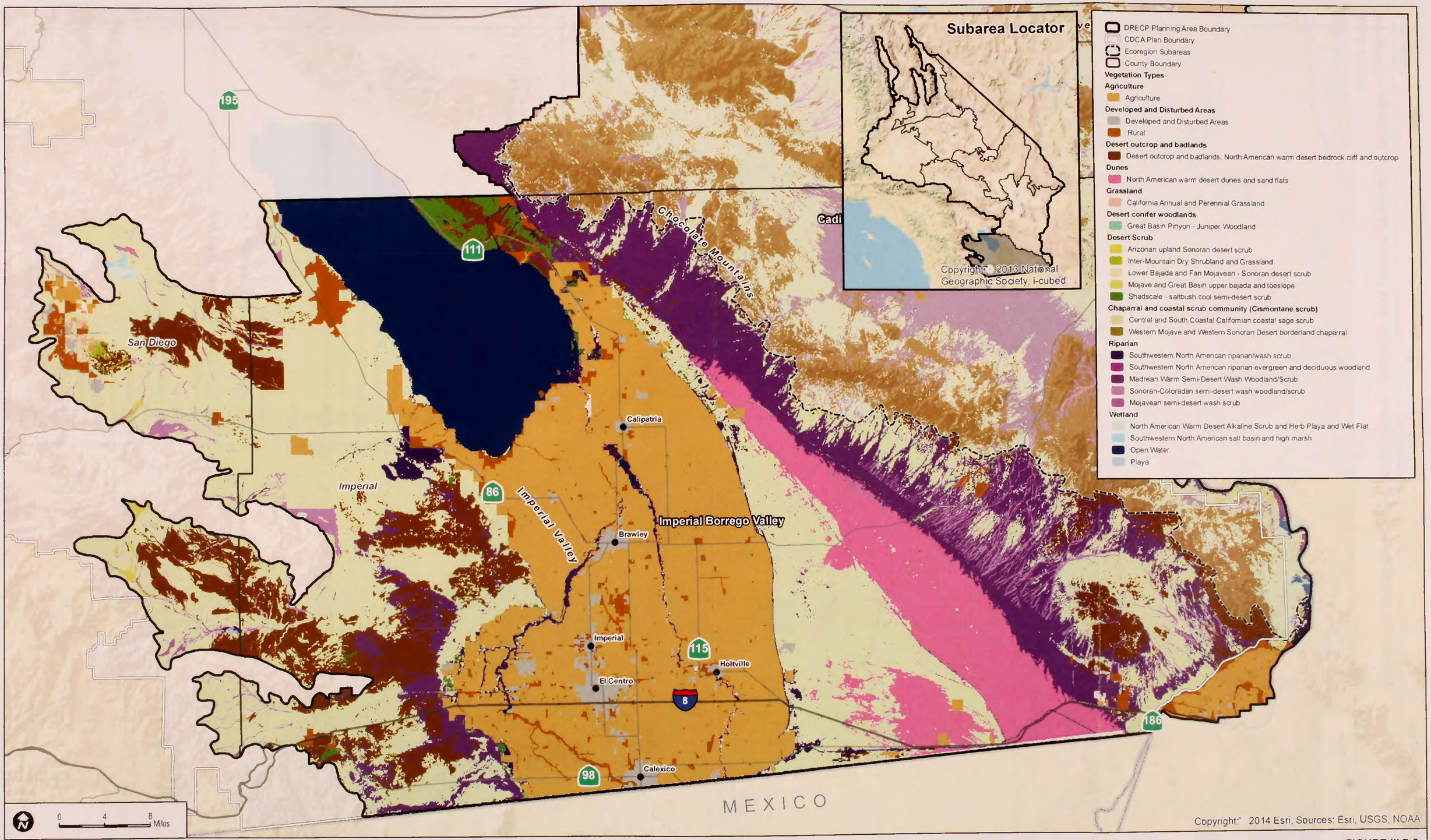


FIGURE III.7-4

Vegetation Types and Other Land Covers - Cadiz Valley and Chocolate Mountains Ecoregion Subarea

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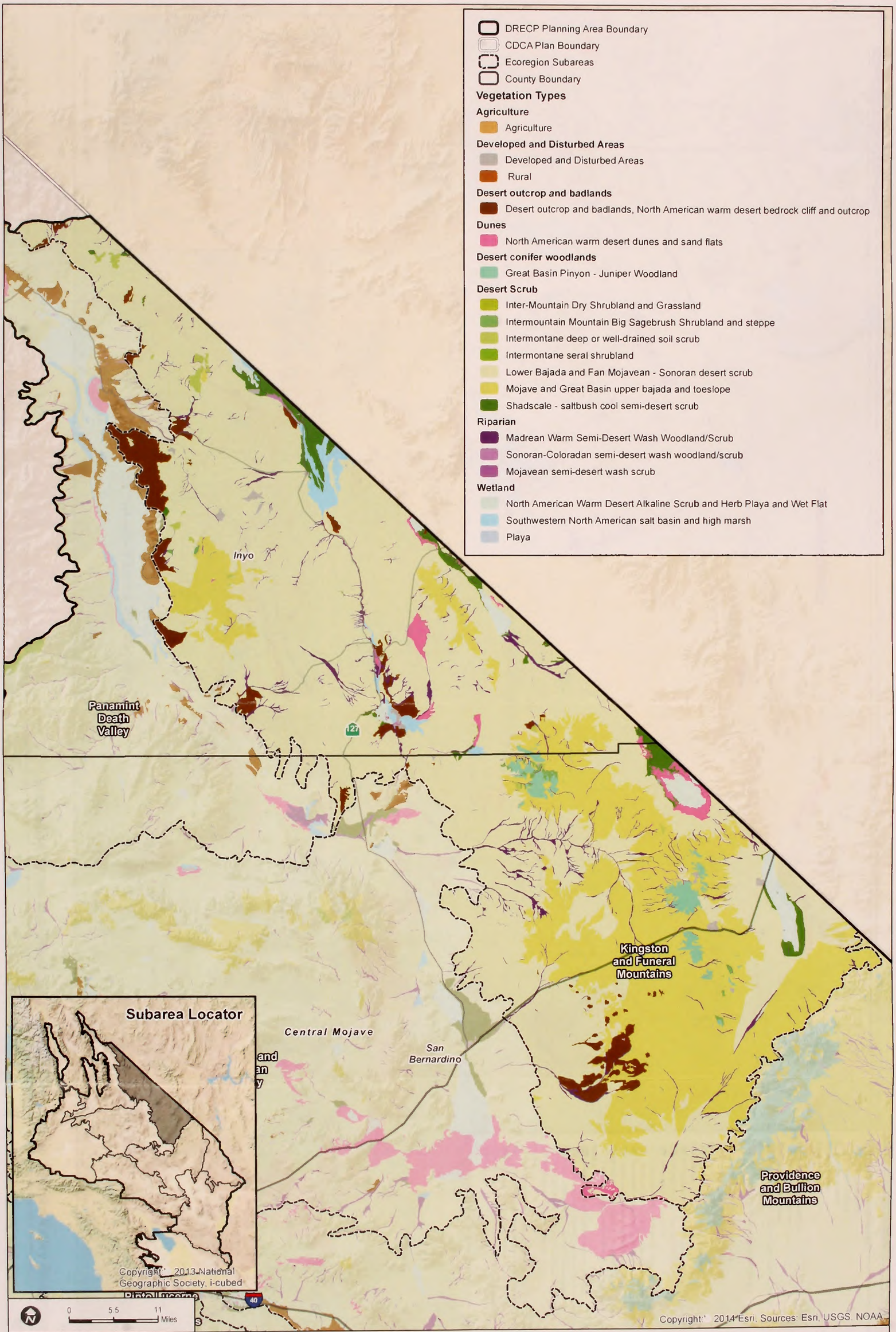


Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2014); USFWS (2013

FIGURE III.7-5

Vegetation Types and Other Land Covers - Imperial Borrego Valley Ecoregion Subarea

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Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2014); USFWS (2013)

FIGURE III.7-6

Vegetation Types and Other Land Covers - Kingston and Funeral Mountains Ecoregion Subarea

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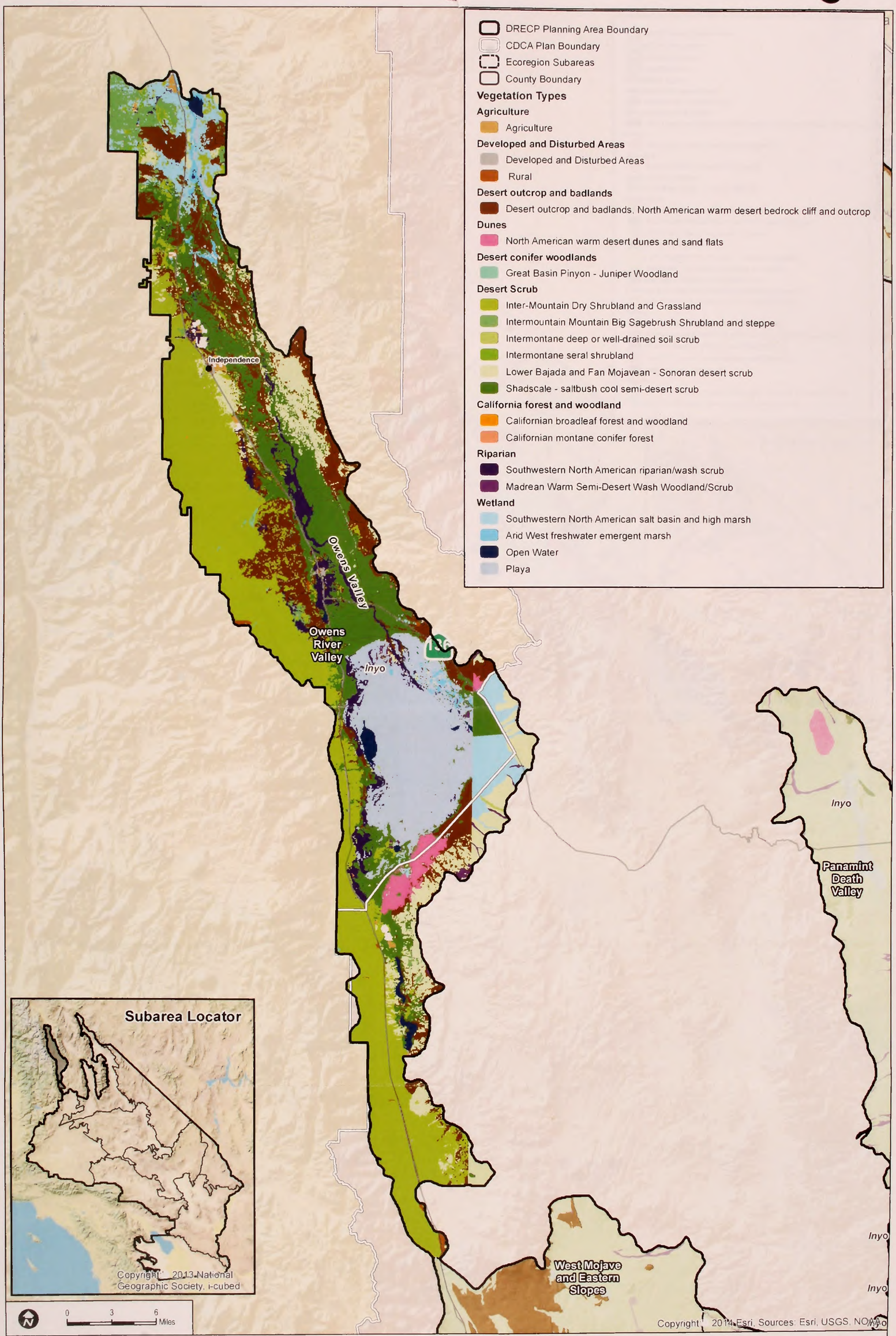


Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2014); USFWS (2013

FIGURE III.7-7

Vegetation Types and Other Land Covers - Mojave and Silurian Valley Ecoregion Subarea

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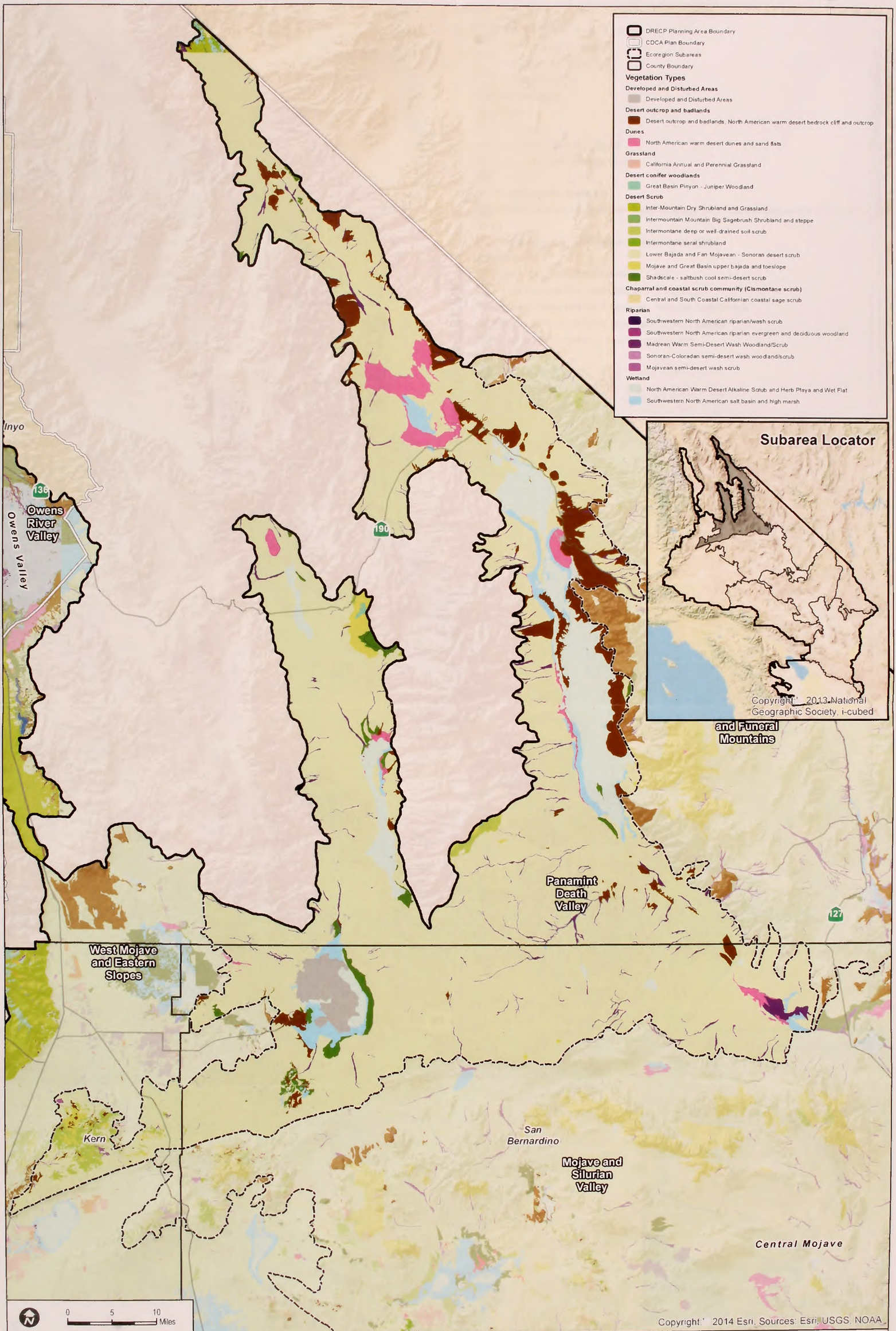


Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2014); USFWS (2013

FIGURE III.7-8

Vegetation Types and Other Land Covers - Owens River Valley Ecoregion Subarea

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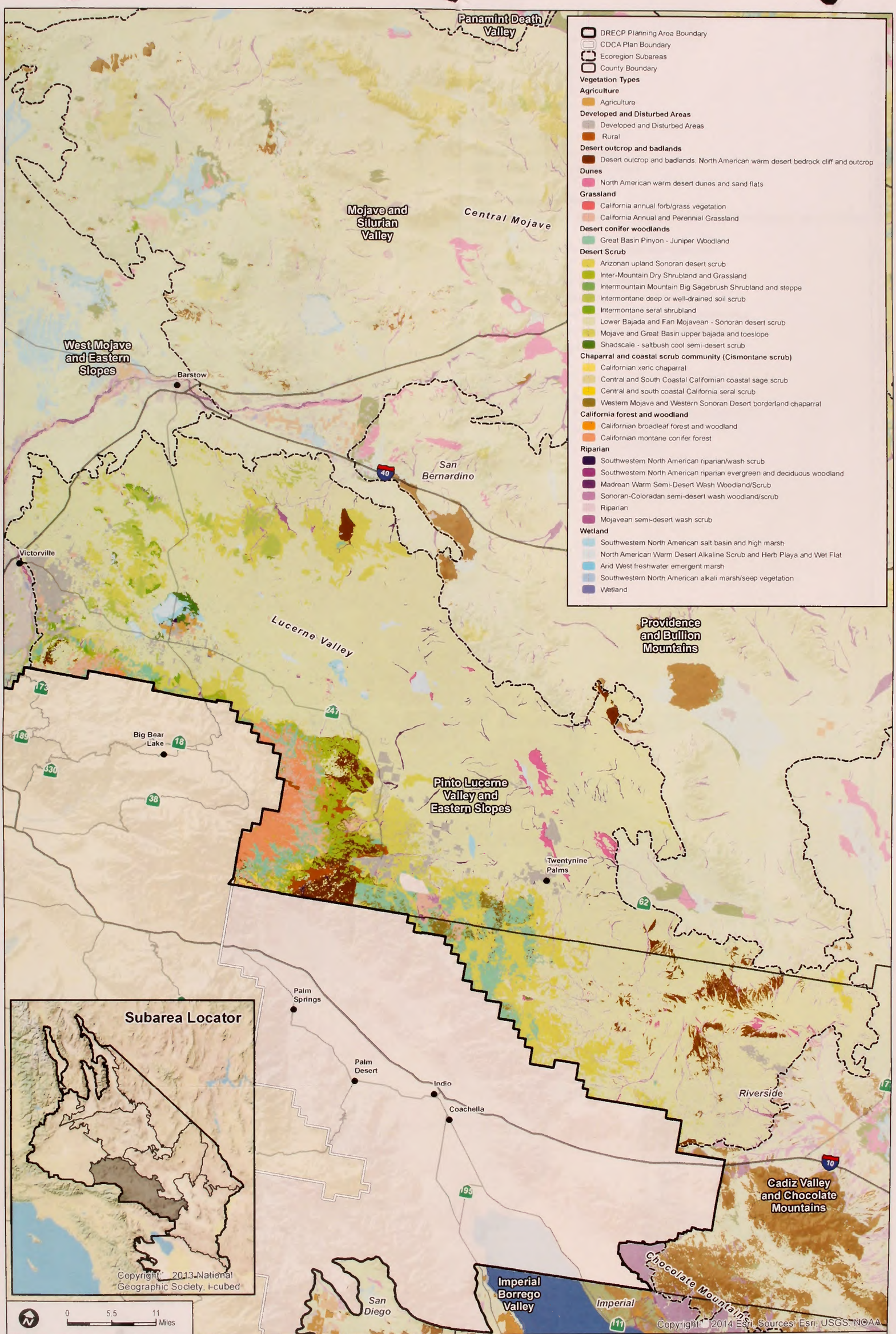


Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2014); USFWS (2013

FIGURE III.7-9

Vegetation Types and Other Land Covers - Panamint Death Valley Ecoregion Subarea

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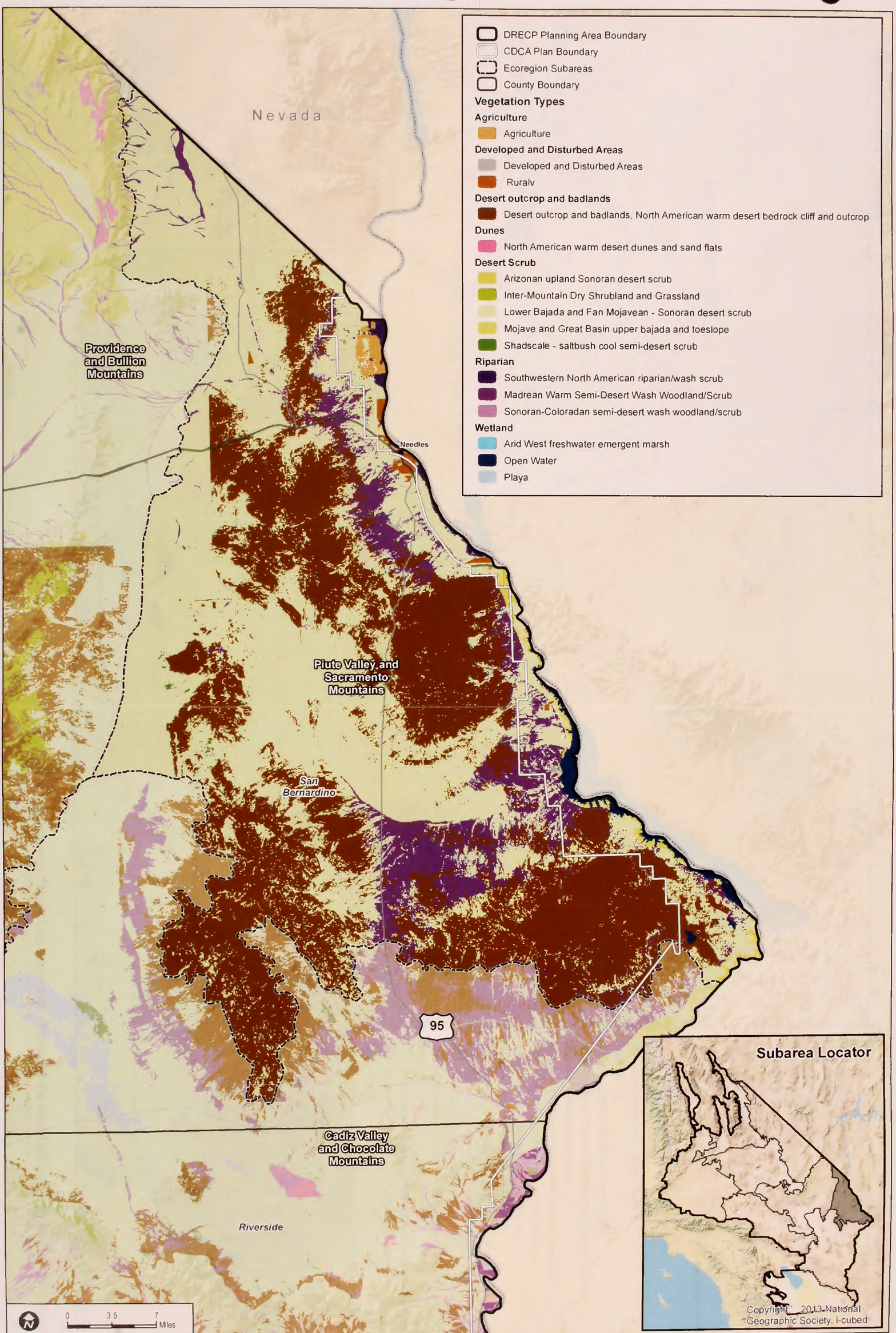


Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2014); USFWS (2013)

FIGURE III.7-10

Vegetation Types and Other Land Covers - Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

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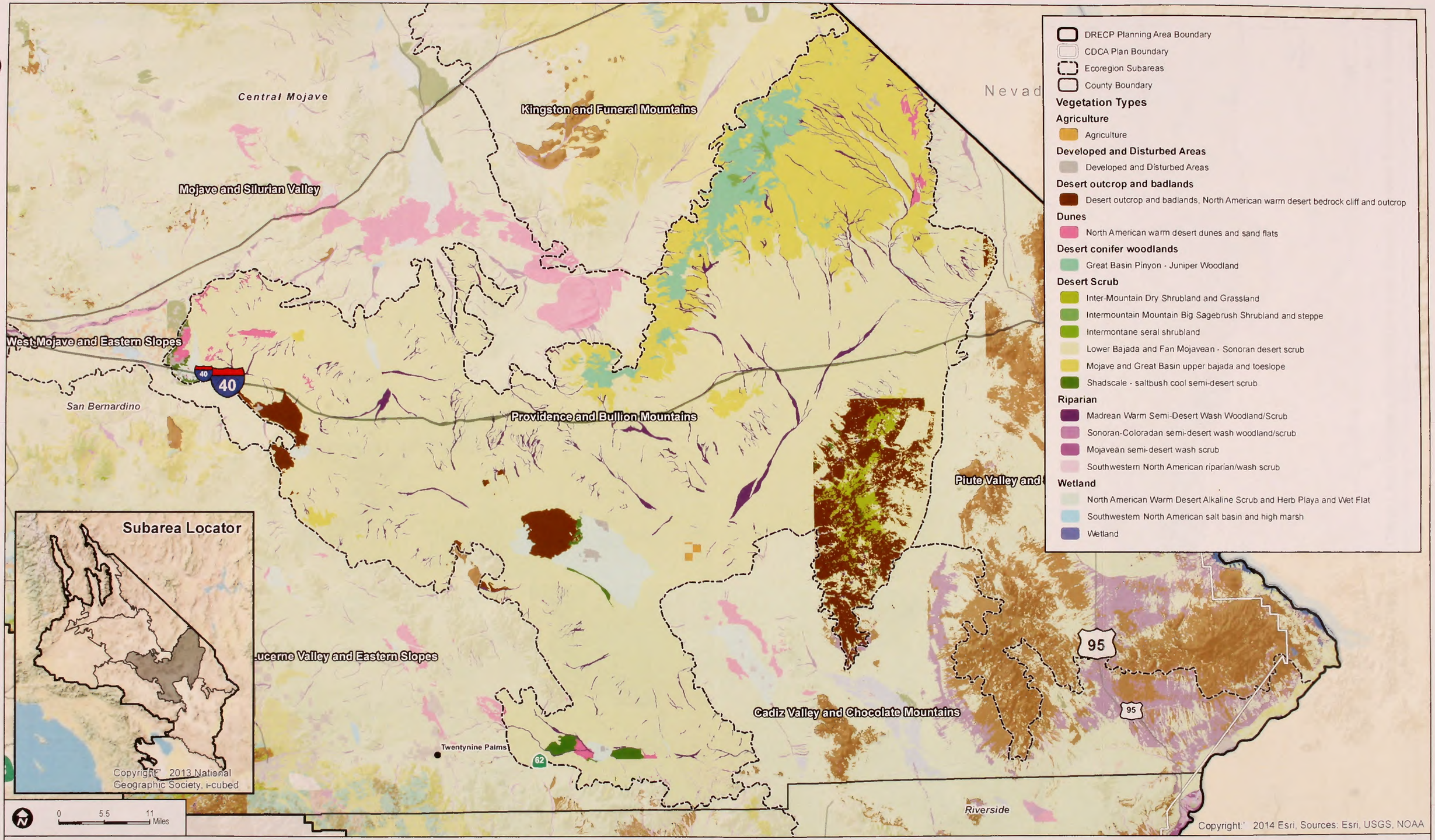


Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2014); USFWS (2013

FIGURE III.7-11

Vegetation Types and Other Land Covers - Piute Valley and Sacramento Mountains Ecoregion Subarea

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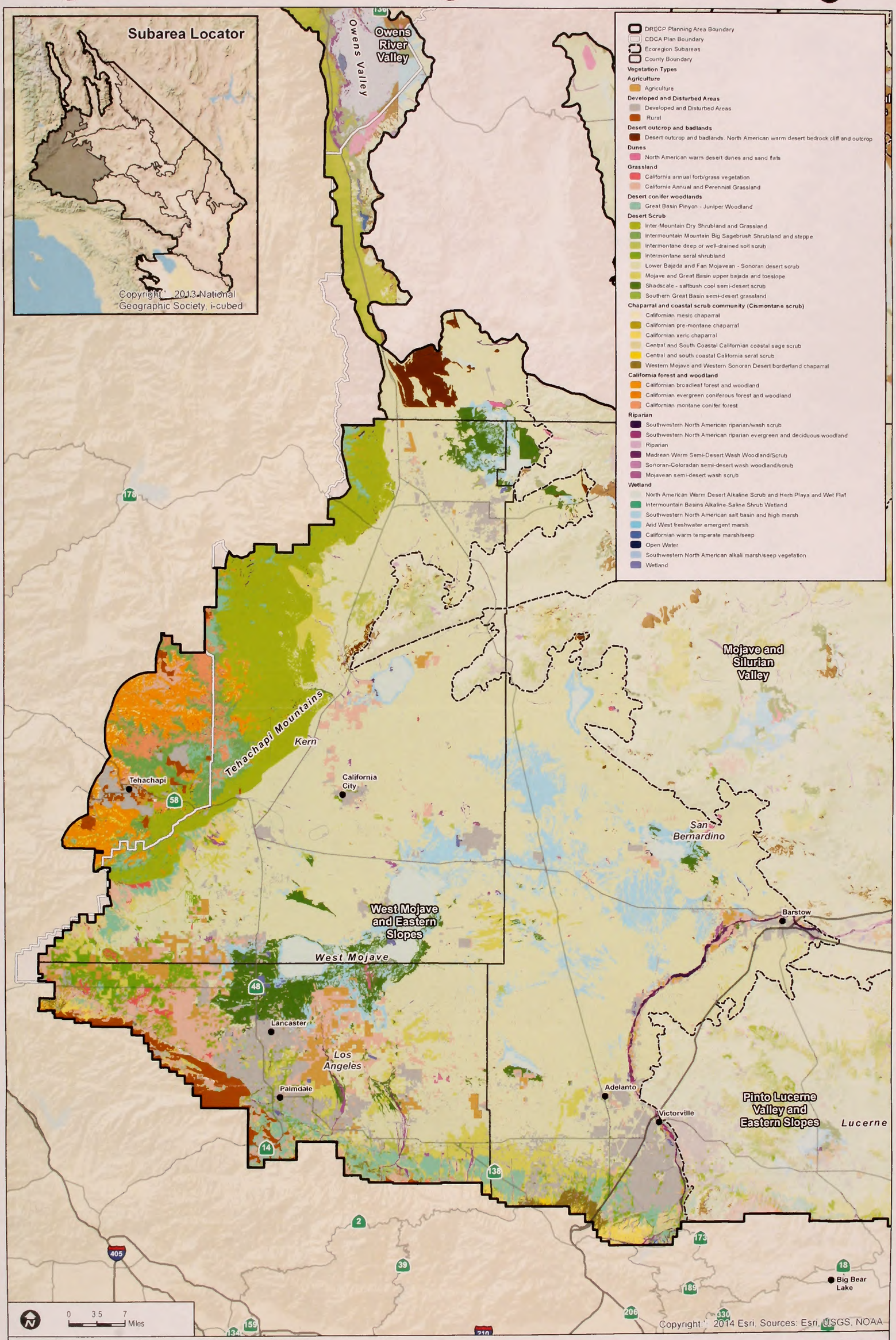


Sources: ESRI (2015), CEC (2013), BLM (2015), CDFW (2014), USFWS (2013

FIGURE III.7-12

Vegetation Types and Other Land Covers - Providence and Bullion Mountains Ecoregion Subarea

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Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2014); USFWS (2013

FIGURE III.7-13

Vegetation Types and Other Land Covers - West Mojave and Eastern Slopes Ecoregion Subareas

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The land cover map was developed from multiple sources by combining fine-scale alliance-level mapping conducted in 2011, 2012, and 2014 for large portions of the Mojave and Colorado/Sonoran deserts within Inyo, Kern, Los Angeles, San Bernardino, Riverside, and Imperial counties with NVCS-based mapping from the Mojave Desert Ecosystem Project, Anza-Borrego Desert State Park, and Rice Valley region in the Cadiz Valley and Chocolate Mountains ecoregion subarea (CDFG 2012a; Aerial Information Systems Inc. 2013; CDFW 2014). In the portions of the DRECP Plan Area where these data sources were not available, the DRECP land cover map uses California Gap (2008 CA-GAP) Vegetation (USGS GAP Program, Lennartz et al. 2008) with updates for agricultural and urban areas. These data include the California Farmland Mapping and Monitoring Program (California Department of Conservation 2009) and a current detailed roads dataset (Dudek and ICF 2011) that capture newer land cover changes associated with rural development.

The Baseline Biology Report (Appendix Q) provides more detail regarding the development of the land cover map and describes various mapping data obtained throughout the DRECP Plan Area.

"Vegetation types" are defined as assemblages of vegetation and the plant and animal species that use that vegetation as habitat. A vegetation type is generally characterized by similarities in vegetation and the natural ecological processes that dominate the community and give it its unique characteristics. For example, a shrubland comprises a number of scrub and chaparral vegetation types and their associated plant and animal species. The distribution of the shrubland, and its various types and associated plants and animals, is influenced by the patterns of microclimate as determined by the interaction of precipitation, elevation, slope and aspect, and fire regime. Vegetation types are defined by a vegetation classification scheme based on the plant species growing together with characteristically uniform structures and habitats, consistent species compositions, and recurrence across the landscape (Jennings et al. 2009, as cited in Appendix Q). Vegetation types are also commonly referred to as vegetation alliances, series, or plant communities (Sawyer et al. 2009, as cited in Appendix Q). Vegetation types are typically characterized by reference to one or more dominant species (Lincoln et al. 1998, as cited in Appendix Q).

The NVCS system has been developed to enable the production of uniform information regarding vegetation resources across the nation, based on vegetation data gathered at varying geographical scales (FGDC 2008, as cited in Dudek and ICF 2011). The NVCS uses a hierarchical system of mapping that includes the following levels:

- Upper levels are predominantly physiognomic, based on physical landscape features and vegetation structure:
    1. Formation class
    2. Formation subclass

3. Formation

- Middle levels are physiognomic, biogeographic, and floristic (i.e., based on species identity):
  1. Division
  2. Macrogroup
  3. Group
- Lower levels are predominantly floristic:
  1. Alliance
  2. Association

Approximately six million acres of the Mojave Desert and Colorado/Sonoran Desert within Inyo, Kern, Los Angeles, San Bernardino, Riverside, and Imperial counties have been mapped recently at the fine-grained alliance level. The remainder of the DRECP Plan Area is described at the group level using a number of different data sources. An alliance is "a floristically defined vegetation type identified by its dominant and/or characteristic species" (Sawyer et al. 2009, as cited in Appendix Q). The group level is defined as "combinations of relatively narrow sets of diagnostic plant species (including dominants and co-dominates), broadly similar composition, and diagnostic growth forms that reflect regional mesoclimate, geology, substrates, hydrology, and disturbance regimes" (Sawyer et al. 2009, as cited in Appendix Q). Floristics play a predominant role in defining alliances in which "diagnostic species, including some from the primary layer, which have moderately similar composition that reflects regional to subregional climate, substrates, hydrology, moisture/nutrient factors, and disturbance regimes" (Sawyer et al. 2009, as cited in Appendix Q).

The particular structure developed for the DRECP was designed to make maximal use of the different levels of mapping methods that have been used throughout the DRECP Plan Area.

Broad Level: "General Vegetation Groups"

At the broadest level, the entire DRECP Plan Area has been divided into nine basic broad descriptive general vegetation groups (e.g., desert scrub, grassland, riparian). They have been selected to be intuitive and understandable and are used primarily as a broad organizational classification.

Mid-Level: "Vegetation Type"

For the purposes of the DRECP, 31 defined vegetation types occur within the DRECP Plan Area, which are directly translated from the mid-levels of the NVCS and align to the "Group" level. These vegetation types underscore the major differences within the wide-ranging

general vegetation groups such as riparian, wetlands, and desert scrub, and help define the floral and faunal biological diversity throughout the DRECP Plan Area that often reflects differences at the subregional scale. Table III.7-11 shows the relationships between the vegetation groups and the vegetation types Plan-wide.

Fine-Grained Level: "Vegetation Alliances"

"Alliance" is the most detailed level of DRECP vegetation type classification, a vegetation unit of uniform floristic composition, habitat and physiognomy, typically defined at the floristic level by diagnostic and dominant plant species, and consistent with the NVCS and Sawyer et al. (2009). State rarity rankings are assigned at the alliance level. Table III.7-11 provides a summary of the vegetation groups under NVCS within the DRECP Plan Area at the vegetation type (i.e., the "Group" level per NVCS) and alliance levels. Where alliance-level data is not available, the vegetation type level (i.e., the "Group" level) is used to characterize the land cover. Descriptions of the vegetation types are provided in Sections III.7.4.2.1 through III.7.4.2.10, but additional detail is provided in the Baseline Biology Report (Appendix Q). Section III.7.4.3 provides tables that include vegetation types and alliances within each ecoregion subarea by general vegetation group.

Rare vegetation types include vegetation alliances with state rarity rankings S1, S2, or S3 (critically imperiled, imperiled, or vulnerable). Occurrences of other vegetation types may be considered locally rare on a regional or site-specific basis but are not considered rare in the context of the DRECP analysis. There are 51 rare vegetation alliances mapped in the DRECP Plan Area that are listed in boldface in Table III.7-11 and shown on Figures III.7-3 through III.7-13.

Table III.7-11
Summary of Vegetation Types and Other Land Cover in DRECP Plan Area

VEGETATION GROUP Vegetation Type Vegetation Alliance[1]	Rarity Ranking[2]	Acres[3]
California Forest and Woodland		*150,000*
Californian broadleaf forest and woodland	—	**72,000**
Californian broadleaf forest and woodland[3]	—	71,000
Aesculus californica	**S3**	**10**
Quercus chrysolepis tree	S5	50
Quercus lobata	**S3**	**100**
Quercus wislizeni tree	S4	500
Californian montane conifer forest	—	**78,000**
Californian montane conifer forest[3]	—	78,000
Pinus sabiniana	S4	200

Table III.7-11
Summary of Vegetation Types and Other Land Cover in DRECP Plan Area

VEGETATION GROUP Vegetation Type Vegetation Alliance[1]	Rarity Ranking[2]	Acres[3]
Chaparral and Coastal Scrub (Cismontane Scrub)		*114,000*
Californian mesic chaparral	**—**	**4,000**
Californian mesic chaparral[3]	—	2,000
Cercocarpus montanus	S4	1,000
Prunus ilicifolia	**S3**	**90**
Quercus berberidifolia	S4	200
Quercus berberidifolia–Adenostoma fasciculatum	S4	200
Californian pre-montane chaparral	**—**	**1,000**
Californian pre-montane chaparral[3]	—	1,000
Arctostaphylos glandulosa	S4	30
Californian xeric chaparral	**—**	**24,000**
Californian xeric chaparral[3]	—	14,000
Adenostoma fasciculatum	S5	9,000
Arctostaphylos glauca	S4	300
Ceanothus crassifolius	NA	<10
Fremontodendron californicum	S4	2,000
Central and south coastal California seral scrub	**—**	**1,000**
Ericameria linearifolia	**S3**	**500**
Eriodictyon (*crassifolium, trichocalyx*)	S4	800
Central and south coastal Californian coastal sage scrub	**—**	**59,000**
Central and south coastal Californian coastal sage scrub[3]	—	40
Eriogonum fasciculatum	S5	59,000
Eriogonum wrightii	**S3**	**10**
Western Mojave and Western Sonoran Desert borderland chaparral	**—**	**24,000**
Western Mojave and Western Sonoran Desert borderland chaparral[3]	—	500
Quercus cornelius-mulleri	S4	11,000
Quercus john-tuckeri	S4	13,000
Desert Conifer Woodland		*287,000*
Great Basin pinyon–juniper woodland	**—**	**287,000**
Great Basin pinyon–juniper woodland[3]	—	129,000
Cercocarpus ledifolius	S4	<10
Juniperus californica (non-locally rare occurrence [LRO])[2]	S4	81,000
Juniperus californica (LRO)	S4, LRO	9,000
Pinus monophylla	S4	67,000
Desert Outcrop and Badlands		*1,871,000*
North American warm desert bedrock cliff and outcrop	**—**	**1,871,000**
North American warm desert bedrock cliff and outcrop[3]	—	1,603,000

Table III.7-11
Summary of Vegetation Types and Other Land Cover in DRECP Plan Area

VEGETATION GROUP Vegetation Type Vegetation Alliance[1]	Rarity Ranking[2]	Acres[3]
Atriplex hymenelytra (non-LRO)	S4	85,000
Atriplex hymenelytra (LRO)	S4, LRO	200
Caesalpinia virgata	**S1?**	**50**
Chorizanthe rigida–Geraea canescens	S4	183,000
Peucephyllum schottii	**S3**	**200**
Desert Scrub		*15,926,000*
Arizonan upland Sonoran desert scrub	—	**62,000**
Arizonan upland Sonoran desert scrub[3]	—	19,000
Agave deserti	**S3**	**3,000**
Tetracoccus hallii	**S1**	**30**
Viguiera parishii	S4	39,000
Intermontane deep or well-drained soil scrub	—	**118,000**
Intermontane deep or well-drained soil scrub[3]	—	17,000
Ephedra nevadensis (non-LRO)	S4	3,000
Ephedra nevadensis (LRO)	S4, LRO	8,000
Ephedra viridis	S4	12,000
Ericameria teretifolia	S4	9,000
Grayia spinosa	S4	55,000
Krascheninnikovia lanata	**S3**	**8,000**
Lycium andersonii	**S3**	**<10**
Lycium cooperi	**S3?**	**1,000**
Purshia tridentata	**S3**	**4,000**
Intermontane seral shrubland	—	**76,000**
Intermontane seral shrubland[3]	—	2,000
Encelia (actoni, virginesis)	**S3**	**6,000**
Ericameria cooperi	S4?	3,000
Ericameria nauseosa	S5	64,000
Gutierrezia sarothrae	**S3**	**90**
Intermountain dry shrubland and grassland	—	**441,000**
Intermountain mountain big sagebrush shrubland and steppe	—	**76,000**
Intermountain mountain big sagebrush shrubland and steppe[3]	—	68,000
Artemisia tridentata	S5	600
Intermountain west mesic tall sagebrush shrubland and steppe		7,000
Lower bajada and fan Mojavean–Sonoran desert scrub	—	**13,354,000**
Lower bajada and fan Mojavean–Sonoran desert scrub[3]	—	8,852,000
Ambrosia dumosa	S5	173,000
Atriplex polycarpa	S4	281,000
Cylindropuntia bigelovii	**S3**	**3,000**

Table III.7-11
Summary of Vegetation Types and Other Land Cover in DRECP Plan Area

VEGETATION GROUP Vegetation Type Vegetation Alliance[1]	Rarity Ranking[2]	Acres[3]
Encelia farinosa	S4	72,000
Fouquieria splendens	**S3**	**3,000**
Larrea tridentata	S5	483,000
Larrea tridentata–Ambrosia dumosa	S5	3,103,000
Larrea tridentata–Encelia farinosa	S4	384,000
Mojave and Great Basin upper bajada and toeslope	—	**1,439,000**
Mojave and Great Basin upper bajada and toeslope[3]	—	1,085,000
Coleogyne ramosissima (non-LRO)	S4	35,000
Coleogyne ramosissima (LRO)	S4, LRO	15,000
Menodora spinescens	**S3**	**100**
Salazaria mexicana	S4	37,000
Yucca brevifolia	**S3**	**190,000**
Yucca schidigera	S4	76,000
Shadscale–saltbush cool semi-desert scrub	—	**361,000**
Shadscale–saltbush cool semi-desert scrub[3]	—	198,000
Atriplex canescens	S4	38,000
Atriplex confertifolia	S4	125,000
Southern Great Basin semi-desert grassland	—	**300**
Southern Great Basin semi-desert grassland[3]	—	40
Achnatherum speciosum	**S2**	**300**
Dune and Sand Based		*414,000*
North American warm desert dunes and sand flats	—	**414,000**
North American warm desert dunes and sand flats[3]	—	290,000
Achnatherum hymenoides	**S1**	**600**
Dicoria canescens–Abronia villosa	**S3**	**10,000**
Panicum urvilleanum	**S1**	**700**
Pleuraphis rigida	**S2**	**30,000**
Prosopis glandulosa **coppice dunes**	**S3?**	**79,000**
Wislizenia refracta	**S2**	**3,000**
Grassland		*244,000*
California annual and perennial grassland		**234,000**
California annual and perennial grassland[3]	—	55,000
Brassica nigra and other mustards	—	1,000
Bromus rubens–Schismus (arabicus, barbatus)	—	5,000
California annual and perennial grassland (native component) Mapping Unit (non-LRO)	—	80,000
California annual and perennial grassland (native component) Mapping Unit (LRO)	LRO	5,000

Table III.7-11
Summary of Vegetation Types and Other Land Cover in DRECP Plan Area

VEGETATION GROUP Vegetation Type Vegetation Alliance[1]	Rarity Ranking[2]	Acres[3]
Mediterranean California naturalized annual and perennial grassland	—	87,000
California annual forb/grass vegetation	—	**9,000**
California annual forb/grass vegetation[3]	—	5,000
Amsinckia (menziesii, tessellata)	S4	400
Eschscholzia (californica) (LRO)	S4, LRO	4,000
Lasthenia californica–Plantago erecta–Vulpia microstachys (LRO)	S4, LRO	100
Riparian		*1,223,000*
Madrean warm semi-desert wash woodland/scrub	—	**910,000**
Mojavean semi-desert wash scrub	—	**37,000**
Mojavean semi-desert wash scrub[3]	—	1,000
Ambrosia salsola	S4	19,000
Artemisia tridentata* ssp. *parishii	**S3?**	**500**
Bebbia juncea	**S3?**	**<10**
Brickellia incana	**S2?**	**300**
Ephedra californica	**S3**	**6,000**
Ericameria paniculata	**S3**	**1,000**
Epidospartum squamatum	**S3**	**6,000**
Prunus fasciculata	**S3**	**2,000**
Riverine[4]	—	**800**
Sonoran–Coloradan semi-desert wash woodland/scrub	—	**198,000**
Sonoran–Coloradan semi-desert wash woodland/scrub[3]	—	2,000
Acacia greggii	S4	22,000
Chilopsis linearis (microphyll)	**S3**	**4,000**
Hyptis emoryi	**S3**	**9,000**
Parkinsonia florida–Olneya tesota (microphyll)	S4	136,000
Pluchea sericea	**S3**	**2,000**
Prosopis glandulosa (microphyll)	**S3**	**10,000**
Psorothamnus spinosus (microphyll)	**S3**	**13,000**
Southwestern North American riparian evergreen and deciduous woodland	—	**6,000**
Southwestern North American riparian evergreen and deciduous woodland[3]	—	2,000
Alnus rhombifolia	S4	<10
Platanus racemosa	**S3**	**100**
Populus fremontii	**S3**	**3,000**
Salix gooddingii	**S3**	**<10**
Salix laevigata	**S3**	**300**

Table III.7-11
Summary of Vegetation Types and Other Land Cover in DRECP Plan Area

VEGETATION GROUP Vegetation Type Vegetation Alliance[1]	Rarity Ranking[2]	Acres[3]
Washingtonia filifera	**S2**	**<10**
Southwestern North American riparian/wash scrub	**—**	**70,000**
Southwestern North American riparian/wash scrub[3]	—	500
Arundo donax	—	10
Baccharis emoryi	**S2?**	**50**
Baccharis salicifolia	S4	200
Baccharis sergiloides	**S3**	**<10**
Forestiera pubescens	**S2**	**100**
Salix exigua	S4	200
Salix lasiolepis	S4	60
Sambucus nigra	**S3**	**70**
Southwestern North American introduced riparian scrub	—	58,000
Tamarix spp.	—	11,000
Wetland		*1,022,000*
Arid West freshwater emergent marsh	**—**	**4,000**
Arid West freshwater emergent marsh[3]	—	38,000
Typha (angustifolia, domingensis, latifolia)	S5	100
Californian warm temperate marsh/seep	**—**	**400**
Juncus arcticus (var. *balticus, mexicanus*)	S4	400
North American warm desert alkaline scrub and herb playa and wet flat	**—**	**391,000**
North American warm desert alkaline scrub and herb playa and wet flat[3]	—	391,000
Sarcobatus vermiculatus	S4	30
Open water[4]	**—**	**214,000**
Playa[4]	**—**	**78,000**
Southwestern North American salt basin and high marsh	**—**	**325,000**
Southwestern North American salt basin and high marsh[3]	—	89,000
Allenrolfea occidentalis	**S3**	**7,000**
Atriplex lentiformis	S4	500
Atriplex parryi	**S2?**	**7,000**
Atriplex spinifera	S4	177,000
Distichlis spicata	S4	400
Frankenia salina	**S3**	**100**
Isocoma acradenia	**S2?**	**40**
Southwestern North American alkali marsh/seep vegetation	—	300
Sporobolus airoides	**S2**	**<10**
Suaeda moquinii	S4	44,000

Table III.7-11
Summary of Vegetation Types and Other Land Cover in DRECP Plan Area

VEGETATION GROUP Vegetation Type Vegetation Alliance[1]	Rarity Ranking[2]	Acres[3]
Lacustrine[4]	—	**9,000**
Other Land Covers		*1,335,000*
Agriculture	—	**733,000**
Developed and disturbed areas	—	**469,000**
Rural		**125,000**
Not mapped[5]	—	**9,000**
	Total	**22,586,000**

1 Only a portion of the DRECP Plan Area, approximately six million acres of the Mojave and Colorado/Sonoran deserts within Inyo, Kern, Los Angeles, San Bernardino, Riverside, and Imperial counties, has been mapped at the more specific alliance level. Where alliance-level data is not available, the higher vegetation type level is used to characterize the land cover.

2 State Rankings: S1 = critically imperiled; S2 = imperiled; S3 = vulnerable; S4 = apparently secure; S5 = secure; ? = inexact numeric rank (NatureServe 2012). LRO = Locally Rare Occurrence. Those in bold typeface are considered rare in the context of the DRECP.

3 Where the alliance name is the same as the vegetation type name, the vegetation type is undifferentiated and not described at the alliance level.

4 This is a land cover type and not specifically a "vegetation type."

5 Small portions of the DRECP Plan Area have been characterized as Not Mapped and are grouped as Other Land Covers. These areas include isolated segments of roadways, canals, and agricultural lands in the Imperial Valley that were not specifically categorized and a narrow strip of the DRECP Plan Area at the U.S.-Mexico border not specifically categorized.

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

III.7.4.2 Vegetation Types and Land Covers

The vegetation types and other land covers across the entire DRECP Plan Area are shown in Figure III.7-3. Figures III.7-4 through III.7-13 show the vegetation types and other land covers by ecoregion subarea.

III.7.4.2.1 California Forest and Woodland

The California forest and woodland vegetation types in the DRECP Plan Area make up approximately 0.7% (150,000 acres) of the land cover and are limited to the higher elevations in the DRECP Plan Area, where they occur primarily in the Tehachapi Mountains in Kern County and the mountains in southwest San Bernardino County. The California forest and woodland vegetation types are found within the Owens River Valley ecoregion subarea, Pinto Lucerne Valley and Eastern Slopes ecoregion subarea, and West Mojave and Eastern Slopes ecoregion subarea (Figures III.7-8, III.7-10, and III.7-13). Two vegetation types of this vegetation group occur in the DRECP Plan Area: Californian broadleaf forest and woodland and Californian montane conifer forest.

III.7.4.2.2 Chaparral and Coastal Scrub

The chaparral and coastal scrub vegetation types make up 0.5% of the DRECP Plan Area (114,000 acres) (Figure III.7-3). There are two scrub vegetation types and four chaparral vegetation types in the DRECP Plan Area (Table III.7-11).

Both the central and south coastal California coastal sage scrub and central and south coastal California seral scrub vegetation types fall within the California coastal scrub macrogroup, which is characterized by a dominance of drought-deciduous shrubs and sometimes deep-rooted sclerophyllous shrubs (woody plants with small leathery evergreen leaves). Central and south coastal California seral scrub is found east of the Tehachapi Mountains near Mojave and in the southern portion of the DRECP Plan Area from Mountain Top Junction east of Highway 138 east to Mojave River Forks Regional Park (Figures III.7-10 and III.7-13). Central and south coastal Californian coastal sage scrub occurs in the Fort Irwin area and in scattered locations west to the DRECP Plan Area boundary (Figures III.7-5, III.7-7, III.7-9, III.7-10, and III.7-13).

The California chaparral macrogroup includes three groups: Californian mesic chaparral, Californian xeric chaparral, and Californian pre-montane chaparral, with Californian xeric chaparral being the most common chaparral vegetation type in the DRECP Plan Area. Californian mesic chaparral occurs in the Tehachapi Mountains and at the base of the San Gabriel Mountains near Antelope Valley in the western portion of the DRECP Plan Area (Figure III.7-13). Californian pre-montane chaparral is primarily found in the Tehachapi Mountains in the DRECP Plan Area (Figure III.7-13). Californian xeric chaparral occurs along the mountainous areas on the western and southern boundaries of the DRECP Plan Area within the West Mojave and Eastern Slopes ecoregion subarea and at the foothills of the San Gabriel Mountains in the Pinto and Lucerne Valley and Eastern Slopes ecoregion subarea (Figures III.7-10 and III.7-13).

Western Mojave and western Sonoran Desert borderland chaparral occurs in scattered locations along the southern boundary of the DRECP Plan Area from the Tehachapi Mountains in the West Mojave and Eastern Slopes ecoregion subarea southeast to the little San Bernardino Mountains in the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea (Figures III.7-4, III.7-5, III.7-10, and III.7-13).

III.7.4.2.3 Desert Conifer Woodland

The desert conifer woodlands in the DRECP Plan Area form approximately 1.3% (287,000 acres) of the land cover and occur primarily in the Tehachapi Mountains area, along the northwestern boundary of the DRECP Plan Area to the San Gabriel Mountains, in the Providence and Bullion Mountains, Kingston and Funeral Mountains, and the Clark Mountain Range (Figures III.7-5 through III.7-10, III.7-12, and III.7-13). One desert conifer

woodland vegetation type occurs in the DRECP Plan Area: Great Basin pinyon–juniper woodland (Table III.7-11).

III.7.4.2.4 Desert Outcrop and Badlands

Desert outcrop and badlands cover approximately 8.3% (1,871,000 acres) of the DRECP Plan Area. This vegetation type includes a single group: North American warm desert bedrock cliff and outcrop (Table III.7-11). North American warm desert bedrock cliff and outcrop is characterized by areas in which vegetation is largely absent. This natural vegetation type occurs throughout much of the DRECP Plan Area (Figures III.7-4 through III.7-13), but is most prevalent in the eastern and southern portions from the Piute Valley south (Figures III.7-4, III.7-5, and III.7-11).

III.7.4.2.5 Desert Scrub

The desert scrub vegetation types cover the majority of the DRECP Plan Area (approximately 70.5% or 15,926,000 acres) (Figure III.7-3). There are eight groups in the DRECP Plan Area and one vegetation type mapped at the broader macrogroup level—intermountain dry shrubland and grassland (Table III.7-11).

Intermountain dry shrubland and grassland vegetation occurs from the Owens River Valley south through the foothills of the Tehachapi Mountains along the northwestern boundary of the DRECP Plan Area. It also occurs at the foothills of the San Gabriel Mountains, in the Piute and Old Woman mountains, and in the Borrego Valley (Figures III.7-4 through III.7-6 and Figures III.7-8 through III.7-13).

The intermontane deep or well-drained soil scrub, Mojave and Great Basin upper bajada and toeslope, and Southern Great Basin semi-desert grassland groups are categorized within the intermountain dry shrubland and grassland vegetation macrogroup. Intermontane deep or well-drained soil scrub is mapped primarily along the southern edge of the West Mojave and Eastern Slopes in the DRECP Plan Area following northwest to the foothills of the Scodie Mountains (Figure III.7-13), the mountainous regions in the northern portion of the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea (Figure III.7-10), and from the Calico Mountains in the Mojave and Silurian Valley ecoregion subarea (Figure III.7-7). Intermontane deep or well-drained soil scrub is also found in the Cadiz Valley and Chocolate Mountains (Figure III.7-4), Kingston and Funeral Mountains (Figure III.7-6), Owens River Valley (Figure III.7-8), and Panamint Death Valley (Figure III.7-9) ecoregion subareas. Mojave and Great Basin upper bajada and toeslope is fairly common throughout much of the DRECP Plan Area (Figures III.7-5 through III.7-7, and Figures III.7-9 through III.7-13) except the southern portion. It is most common in the Kingston and Funeral Mountains and Providence and Bullion Mountains in the eastern portion of the DRECP Plan Area (Figures III.7-6 and

III.7-12). Southern Great Basin semi-desert grassland occurs in some scattered locations in the Superior Valley in the Mojave and Silurian Valley ecoregion subarea and in the northern portion of the West Mojave and Eastern Slopes ecoregion subarea (Figures III.7-7 and III.7-13).

The majority of the scrub vegetation types in the DRECP Plan Area consist of two groups: lower bajada and fan Mojavean–Sonoran desert scrub and Arizonan upland Sonoran desert scrub. Lower bajada and fan Mojavean–Sonoran desert scrub is found throughout most of the DRECP Plan Area except for the mountainous regions along the border of the West Mojave and Eastern Slopes ecoregion subarea and substantial portions of the Owens River Valley, Kingston and Funeral Mountains, and Imperial Borrego Valley ecoregion subareas (Figure III.7-3; Figures III.7-4 through III.7-13). Arizonan upland Sonoran desert scrub primarily occurs along the Colorado River and in the southern portion of the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea (Figure III.7-10), but also occurs in the Cadiz Valley and Chocolate Mountains (Figure III.7-4), Imperial Borrego Valley (Figure III.7-5), and Piute Valley and Sacramento Mountains (Figure III.7-11) ecoregion subareas.

Intermontane seral shrubland occurs primarily in the mountainous regions along the western boundary of the DRECP Plan Area in the West Mojave and Eastern Slopes and Pinto Lucerne Valley and Eastern Slopes ecoregion subareas (Figure III.7-3; Figures III.7-6 through III.7-10, and Figures III.11 through III.13). Intermountain mountain big sagebrush shrubland and steppe occurs primarily in the Tehachapi Mountains, but it also occurs in the northernmost portion of the DRECP Plan Area in the Owens River Valley, and in the Kingston Range, the Ivanpah Mountains, Providence Mountains, and San Bernardino Mountains (Figures III.7-6 through III.7-10, III.7-12, and III.7-13).

Shadscale–saltbush cool semi-desert scrub is scattered throughout much of the DRECP Plan Area but is most concentrated in the Owens River Valley, northeast of the Salton Sea, and the area around Lancaster (Figure III.7-3; Figures III.7-4 through III.7-13).

III.7.4.2.6 Dune and Sand-Based Vegetation

Dunes make up approximately 1.8% (414,000 acres) of the DRECP Plan Area and include one vegetation type—North American warm desert dunes and sand flats (Table III.7-11). This vegetation type occurs throughout the DRECP Plan Area (Figure III.7-3; Figures III.7-4 through III.7-13), with approximately 16 named dune systems, including approximately 12 systems in the Mojave Desert and lower Great Basin Desert and 4 systems in the Sonoran Desert, as well as numerous smaller dunes. The largest dune area, which includes the Algodones Dunes, is located in the East Mesa–Sand Hill portion of the Sonoran Desert (Figure III.7-5).

III.7.4.2.7 Grassland

Grassland vegetation types cover approximately 1.1% (244,000 acres) of the DRECP Plan Area and include the macrogoup California annual and perennial grassland and the more specific California annual forb/grass vegetation group (Table III.7-11). California annual and perennial grassland is most common in the western portion of the DRECP Plan Area, especially along the boundary north of the San Bernardino National Forest (Figures III.7-4, III.7-5, III.7, III.7-9, III.7-10, and III.7-13). California annual forb/grass vegetation occurs mainly in the western portion of the DRECP Plan Area in the West Mojave and Eastern Slopes and Mojave and Silurian Valley ecoregion subareas, although there is also a small amount in the Ord Mountains of the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea (Figures III.7-4, III.7-7, III.7-10, and III.7-13).

III.7.4.2.8 Riparian

Riparian vegetation types constitute approximately 5.4% (1,223,000 acres) of the DRECP Plan Area and include a riverine category and five vegetation types: Madrean warm semi-desert wash woodland/scrub, Mojavean semi-desert wash scrub, Sonoran–Coloradan semi-desert wash woodland/scrub, Southwestern North American riparian evergreen and deciduous woodland, and Southwestern North American riparian/wash scrub (Figure III.7-3, Table III.7-11). About 75% of the riparian vegetation is mapped only at the macrogroup level as Madrean warm semi-desert wash woodland/scrub.

Madrean warm semi-desert wash woodland/scrub is mapped in defined desert washes distinctly different in plant composition and/or cover compared to adjacent upland vegetation types, in areas that did not receive alliance level mapping. This conglomerate group has been defined as a vegetation type for the purposes of the DRECP and is mapped in all of the DRECP Plan Area's ecoregion subareas (Figure III.7-3; Figures III.7-4 through III.7-13) but is most common in the Cadiz and Chocolate Mountains and Imperial Borrego Valley (Figures III.7-4 and III.7-5). Microphyll woodlands may occur within this vegetation type.

Mojavean semi-desert wash scrub is one of two groups or vegetation types within the Madrean warm semi-desert wash woodland/scrub macrogroup. This vegetation type occurs in many scattered locations throughout the DRECP Plan Area (Figures III.7-4 through III.7-7, III.7-9, III.7-10, III.7-12, and III.7-13), but is most common in the western portion of the DRECP Plan Area (Figure III.7-13), and is differentiated from the Sonoran–Coloradan semi-desert wash woodland/scrub vegetation type by specific alliances.

Sonoran–Coloradan semi-desert wash woodland/scrub is the second group or vegetation type within the Madrean warm semi-desert wash woodland/scrub macrogroup. This vegetation type occurs primarily in the southern portion of the DRECP Plan Area from the Twentynine Palms area southeast to the Palo Verde Valley and in the Imperial Borrego

Valley area (Figures III.7-4 through III.7-7 and Figures III.7-9 through III.7-13), and is restricted to the Colorado/Sonoran Desert biome. Microphyll woodlands, as defined in the DRECP, are comprised of four alliances within this vegetation type.

Southwestern North American riparian evergreen and deciduous woodlands are characterized by riparian winter deciduous, broad-leaved trees or tall shrubs, including Fremont cottonwood (*Populus fremontii*), California sycamore (*Platanus racemosa*), and/or willows (*Salix* spp.). This vegetation type occurs primarily in the Tehachapi Mountains and along the Mojave and Colorado rivers within the DRECP Plan Area (Figures III.7-5, III.7-7, III.7-9, III.7-10, and III.7-13).

Southwestern North American riparian/wash scrub is characterized by native or non-native riparian shrubs and lacks a significant cover or presence of riparian trees. This vegetation type primarily occurs in the Owens Valley and Imperial Valley, but occurs elsewhere throughout the DRECP Plan Area (Figures III.7-4, III.7-5, and III.7-7 through III.7-13).

III.7.4.2.9 Wetland

Wetland vegetation types cover approximately 4.5% (1,022,000 acres) of the DRECP Plan Area and include five vegetation types (Table III.7-11). Arid West freshwater emergent marsh occurs primarily in the Owens River Valley and the West Mojave and Eastern Slopes ecoregion subareas, but also occurs in other ecoregion subareas (Figures III.7-4, III.7-8, III.7-10, III.7-11, and III.7-13). Californian warm temperate marsh/seep is present in the southern portion of the West Mojave and Eastern Slopes ecoregion subarea and near the Paradise Range in the Mojave and Silurian Valley ecoregion subarea (Figures III.7-7 and III.7-13). North American warm desert alkaline scrub and herb playa and wet flat is widespread throughout much of the DRECP Plan Area and ranges from Edwards Air Force Base (EAFB) to Death Valley in the northeast, to Ivanpah Valley along the eastern boundary, and southeast to the Chuckwalla Valley. Its southwestern extent in the DRECP Plan Area is in the Anza-Borrego State Park (Figures III.7-4 through III.7-7, III.7-9, III.7-10, III.7-12, and III.7-13). Most of the DRECP Plan Area's Southwestern North American salt basin and high marsh occurs in the West Mojave and Eastern Slopes ecoregion subarea, but this vegetation type is relatively wide ranging, spanning from the Owens Valley to south of Blythe and west of the Salton Sea (Figures III.7-4 through III.7-10, III.7-12, and III.7-13).

Open Water, Playa, and Lacustrine Areas

Open water accounts for approximately 21% (215,000 acres) of the wetland vegetation types in the DRECP Plan Area (Figures III.7-4, III.7-5, III.7-8, III.7-11, and III.7-13), the majority of which is the Salton Sea. Lacustrine makes up less than 1% of the wetland vegetation types in the DRECP Plan Area and occurs along the California Aqueduct in the

southern portion of the West Mojave and Eastern Slopes ecoregion subarea and areas near Ridgecrest in the northern portion of this ecoregion subarea, as well as locations in between. It is also scattered throughout the Mojave Valley area east of Barstow and occurs in the Pinto Lucerne Valley and Eastern Slopes and Cadiz Valley and Chocolate Mountains ecoregion subareas (Figures III.7-4, III.7-7, III.7-10, III.7-12, and III.7-13). Playa consists of 8% of the wetland vegetation types and is most prevalent in the Owens River Valley and Ward Valley, but occurs elsewhere as well (Figures III.7-4, III.7-5, III.7-6, III.7-8, and III.7-11). Riverine is mapped in areas of rivers or streams that lack substantial cover of riparian vegetation. This land cover type is primarily mapped along the Mojave and Colorado rivers (Figures III.7-4, III.7-10, and III.7-13).

III.7.4.2.10 Other Land Covers

Agriculture

Agricultural areas are mapped over approximately 3.2% (733,000 acres) of the DRECP Plan Area and are concentrated in three main regions: the Imperial Valley south of the Salton Sea, Palo Verde Valley in the Blythe region, and Antelope Valley in the western Mojave Desert (Figures III.7-4 through III.7-8, and III.7-10 through III.7-13).

Almost 500,000 acres in Imperial County are in agricultural production (Imperial County Farm Bureau 2011, as cited in Appendix Q). Field crops account for most of the land in production, including about 166,000 acres of alfalfa, 66,000 acres of Sudan grass for hay, 44,000 acres of wheat, and 34,000 acres of sugar beets (University of California–Davis 2011a, as cited in Appendix Q). Major vegetable crops include lettuce, cabbage, carrots, onions, broccoli, cauliflower, sweet corn, bell pepper, chili peppers, cantaloupes, mixed melons, and watermelons (University of California–Davis 2011a, as cited in Appendix Q). Imperial County also supports the largest number of feedlot and fed cattle in California (University of California–Davis 2011a, as cited in Appendix Q).

The Palo Verde Valley supports about 108,000 acres of agricultural lands, of which about 60% are alfalfa, 11% cotton, 6% wheat and barley, and 5% Sudan grass and Bermuda grass (*Cynodon dactylon*) (Barrows 2007, as cited in Appendix Q). Agriculture in the Antelope Valley is on a much smaller scale than the Imperial and Palo Verde valleys. The acreage of vegetable crops in the Antelope Valley increased from about 9,000 acres in 1999 to 11,670 acres in 2000, due primarily to the carrot industry (University of California–Davis 2011a, as cited in Appendix Q). Other crops include alfalfa, dry onions, carrots, potatoes, peaches, grapes, and nectarines.

Developed and Disturbed Areas

Developed and disturbed land is mapped over approximately 2.1% (469,000 acres) of the DRECP Plan Area and includes low- to high-intensity urban development and open space associated with developed areas, including uses such as golf courses (Figure III.7-3 and Figures III.7-4 through III.7-13). Developed areas are concentrated in the western Mojave in the Palmdale/Lancaster area; Victorville, Barstow, and Ridgecrest; and in the Colorado/Sonoran Desert in the El Centro area of the Imperial Valley and the Blythe area. Disturbed lands occur primarily in the western Mojave area west and north of EAFB and the Ridgecrest area.

Rural

Rural land is mapped over approximately 0.5% (124,835 acres) of the DRECP Plan Area. Rural land in the DRECP Plan Area includes areas of rural development in the west Mojave, Morongo Valley, western Imperial Valley, and Blythe areas.

A small portion of the DRECP Plan Area, located largely in the west Mojave, Imperial Valley, and along the eastern edge of the DRECP Plan Area, is classified as "unmapped" due to lack of data in the source data for the land cover layer (Figures III.7-4 through III.7-6, III.7-8, III.7-9, and III.7-11 through III.7-13). These areas are primarily characterized by rural development or agricultural land uses.

III.7.4.3 Vegetation Types and Other Land Covers by Ecoregion Subarea

III.7.4.3.1 Cadiz Valley and Chocolate Mountains Ecoregion Subarea

The vegetation types and other land covers within the Cadiz Valley and Chocolate Mountains ecoregion subarea are detailed in Table III.7-12 and shown in Figure III.7-4.

Table III.7-12
Vegetation Types and Other Land Covers
in the Cadiz Valley and Chocolate Mountains Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
Chaparral and coastal scrub (Cismontane scrub)	Western Mojave and western Sonoran Desert borderland chaparral	—	90
Desert outcrop and badlands	North American warm desert bedrock cliff and outcrop	*Chorizanthe rigida–Geraea canescens*	154,000
		—	555,000

Table III.7-12
Vegetation Types and Other Land Covers in the Cadiz Valley and Chocolate Mountains Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
Desert scrub	Arizonan upland Sonoran desert scrub	—	13,000
	Intermontane deep or well-drained soil scrub	*Ephedra nevadensis*	2,000
		Lycium andersonii	10
	Intermountain dry shrubland and grassland	—	40
	Lower bajada and fan Mojavean–Sonoran desert scrub	*Ambrosia dumosa*	3,000
		Atriplex polycarpa	1,000
		Encelia farinosa	48,000
		Larrea tridentata	186,000
		Larrea tridentata–Ambrosia dumosa	309,000
		Larrea tridentata–Encelia farinosa	219,000
		—	923,000
	Shadscale–saltbush cool semi-desert scrub	*Atriplex canescens*	9,000
		—	7,000
Dunes	North American warm desert dunes and sand flats	*Dicoria canescens–Abronia villosa*	7,000
		Pleuraphis rigida	2,000
		Prosopis glandulosa coppice dunes	3,000
		Wislizenia refracta	3,000
		—	11,000
Grassland	California annual and perennial grassland	*Brassica nigra* and other mustards	1,000
		Mediterranean California naturalized annual and perennial grassland	6,000
	California annual forb/grass vegetation	*Amsinckia (menziesii, tessellata)*	60
Riparian	Madrean warm semi-desert wash woodland/scrub	—	272,000
	Mojavean semi-desert wash scrub	*Ambrosia salsola*	300
		Bebbia juncea	10
		Ephedra californica	2,000
	Riverine[2]	—	600
	Sonoran–Coloradan semi-desert wash woodland/scrub	*Acacia greggii*	1,000
		Chilopsis linearis	20
		Hyptis emoryi	3,000
		Parkinsonia florida–Olneya tesota	98,000
		Pluchea sericea	2,000
		Prosopis glandulosa	2,000

Table III.7-12
Vegetation Types and Other Land Covers
in the Cadiz Valley and Chocolate Mountains Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
		Psorothamnus spinosus	900
		—	600
	Southwestern North American riparian/wash scrub	*Arundo donax*	10
		Tamarix spp.	5,000
		—	7,000
Wetlands	Arid West freshwater emergent marsh	*Typha (angustifolia, domingensis, latifolia)*	20
		—	100
	North American warm desert alkaline scrub and herb playa and wet flat	—	22,000
	Open water[2]	—	5,000
	Playa[2]	—	27,000
	Southwestern North American salt basin and high marsh	*Allenrolfea occidentalis*	1,000
		Atriplex lentiformis	400
		Suaeda moquinii	10,000
	Lacustrine[2]	—	1,000
Other land covers	Agriculture	—	113,000
	Developed and disturbed areas	—	19,000
	Not mapped	—	400
		Total	**3,064,000**

[1] Only a portion of the DRECP Plan Area, approximately six million acres of the Mojave and Colorado/Sonoran deserts within Inyo, Kern, Los Angeles, San Bernardino, Riverside, and Imperial counties, has been mapped at the more specific alliance level.

[2] This is a land cover type and not specifically a "vegetation type."

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

III.7.4.3.2 Imperial Borrego Valley Ecoregion Subarea

The vegetation types and other land covers within the Imperial Borrego Valley ecoregion subarea are detailed in Table III.7-13 and shown in Figure III.7-5.

Table III.7-13
Vegetation Types and Other Land Covers within the Imperial Borrego Valley Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
Chaparral and coastal scrub (Cismontane scrub)	Central and south coastal Californian coastal sage scrub	—	20
	Western Mojave and Western Sonoran Desert borderland chaparral	—	30
Desert conifer woodlands	Great Basin pinyon–juniper woodland	*Juniperus californica*	200
		Pinus monophylla	<10
Desert outcrop and badlands	North American warm desert bedrock cliff and outcrop	*Caesalpinia virgata*	50
		—	222,000
Desert scrub	Arizonan upland Sonoran desert scrub	*Agave deserti*	3,000
		—	700
		Viguiera parishii	30
	Intermountain dry shrubland and grassland	—	1,000
	Lower bajada and fan Mojavean–Sonoran desert scrub	*Ambrosia dumosa*	46,000
		Atriplex polycarpa	4,000
		Cylindropuntia bigelovii	3,000
		Encelia farinosa	13,000
		Fouquieria splendens	3,000
		Larrea tridentata	28,000
		Larrea tridentata–Ambrosia dumosa	95,000
		Larrea tridentata–Encelia farinosa	11,000
		—	555,000
	Mojave and Great Basin upper bajada and toeslope	*Coleogyne ramosissima*	10
		Yucca schidigera	200
	Shadscale–saltbush cool semi-desert scrub	—	21,000
Dunes	North American warm desert dunes and sand flats	—	175,000
		Pleuraphis rigida	20
		Prosopis glandulosa coppice dunes	700
Grassland	California annual and perennial grassland	—	2,000
		Bromus rubens–Schismus (arabicus, barbatus)	30

Table III.7-13
Vegetation Types and Other Land Covers within the Imperial Borrego Valley Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
Riparian	Madrean warm semi-desert wash woodland/scrub	—	285,000
	Mojavean semi-desert wash scrub	*Ambrosia salsola*	3,000
	Sonoran–Coloradan semi-desert wash woodland/scrub	*Acacia greggii*	1,000
		Chilopsis linearis	300
		Hyptis emoryi	2,000
		Parkinsonia florida–Olneya tesota	33,000
		Prosopis glandulosa	7,000
		Psorothamnus spinosus	5,000
		—	1,000
	Southwestern North American riparian evergreen and deciduous woodland	*Washingtonia filifera*	10
	Southwestern North American riparian/wash scrub	*Baccharis emoryi*	50
		Tamarix spp.	300
		Southwestern North American introduced riparian scrub	31,000
Wetland	North American warm desert alkaline scrub and herb playa and wet flat	—	2,000
	Open water[2]	—	196,000
	Playa[2]	—	100
	Southwestern North American salt basin and high marsh	*Allenrolfea occidentalis*	400
		—	<10
		Suaeda moquinii	600
Other land covers	Agriculture	—	543,000
	Developed and disturbed areas	—	40,000
	Rural	—	58,000
	Not mapped	—	6,000
		Total	**2,400,000**

[1] Only a portion of the DRECP Plan Area, approximately six million acres of the Mojave and Colorado/Sonoran deserts within Inyo, Kern, Los Angeles, San Bernardino, Riverside, and Imperial counties, has been mapped at the more specific alliance level.

[2] This is a land cover type and not specifically a "vegetation type."

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

III.7.4.3.3 Kingston and Funeral Mountains Ecoregion Subarea

The vegetation types and other land covers within the Kingston and Funeral Mountains ecoregion subarea are detailed in Table III.7-14 and shown in Figure III.7-6.

Table III.7-14
Vegetation Types and Other Land Covers
in the Kingston and Funeral Mountains Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
Desert conifer woodlands	Great Basin pinyon–juniper woodland	—	12,000
		Pinus monophylla	12,000
Desert outcrop and badlands	North American warm desert bedrock cliff and outcrop	*Atriplex hymenelytra*	27,000
		—	50,000
Desert scrub	Intermontane deep or well-drained soil scrub	—	8,000
	Intermontane seral shrubland	—	<10
	Intermountain dry shrubland and grassland	—	20
	Intermountain mountain big sagebrush shrubland and steppe	—	4,000
	Lower bajada and fan Mojavean–Sonoran desert scrub	—	1,528,000
	Mojave and Great Basin upper bajada and toeslope	—	623,000
	Shadscale–saltbush cool semi-desert scrub	*Atriplex confertifolia*	19,000
		—	24,000
Dunes	North American warm desert dunes and sand flats	—	4,000
		Pleuraphis rigida	2,000
		Prosopis glandulosa coppice dunes	19,000
Riparian	Madrean warm semi-desert wash woodland/scrub	—	72,000
	Mojavean semi-desert wash scrub	—	800
	Sonoran–Coloradan semi-desert wash woodland/scrub	*Prosopis glandulosa*	2,000
Wetland	North American warm desert alkaline scrub and herb playa and wet flat	—	33,000
	Playa[2]	—	<10

Table III.7-14
Vegetation Types and Other Land Covers
in the Kingston and Funeral Mountains Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
	Southwestern North American salt basin and high marsh	—	22,000
Other land covers	Agriculture		70
	Developed and disturbed areas		9,000
		Total	**2,470,000**

[1] Only a portion of the DRECP Plan Area, approximately six million acres of the Mojave and Colorado/Sonoran deserts within Inyo, Kern, Los Angeles, San Bernardino, Riverside, and Imperial counties, has been mapped at the more specific alliance level.
[2] This is a land cover type and not specifically a "vegetation type."

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

III.7.4.3.4 Mojave and Silurian Valley Ecoregion Subarea

The vegetation types and other land covers within the Mojave and Silurian Valley ecoregion subarea are detailed in Table III.7-15 and shown in Figure III.7-7.

Table III.7-15
Vegetation Types and Other Land Covers
in the Mojave and Silurian Valley Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
Chaparral and coastal scrub (Cismontane scrub)	Central and south coastal Californian coastal sage scrub	*Eriogonum fasciculatum*	8,000
Desert conifer woodlands	Great Basin pinyon–juniper woodland	*Pinus monophylla*	100
Desert outcrop and badlands	North American warm desert bedrock cliff and outcrop	*Atriplex hymenelytra*	4,000
		Chorizanthe rigida–Geraea canescens	1,000
		—	17,000
		Peucephyllum schottii	200
Desert scrub	Intermontane deep or well-drained soil scrub	*Ephedra nevadensis*	200
		Ephedra viridis	600
		Ericameria teretifolia	5,000
		Grayia spinosa	22,000

Table III.7-15
Vegetation Types and Other Land Covers in the Mojave and Silurian Valley Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
		—	3,000
		Krascheninnikovia lanata	2,000
		Lycium cooperi	700
	Intermontane seral shrubland	*Ericameria cooperi*	800
		Ericameria nauseosa	100
	Lower bajada and fan Mojavean–Sonoran desert scrub	*Ambrosia dumosa*	23,000
		Atriplex polycarpa	57,000
		Encelia farinosa	2,000
		Larrea tridentata	40,000
		Larrea tridentata–Ambrosia dumosa	543,000
		Larrea tridentata–Encelia farinosa	3,000
		—	1,471,000
	Mojave and Great Basin upper bajada and toeslope	*Coleogyne ramosissima*	16,000
		—	76,000
		Salazaria mexicana	9,000
		Yucca brevifolia	8,000
		Yucca schidigera	2,000
	Shadscale–saltbush cool semi-desert scrub	*Atriplex canescens*	3,000
		Atriplex confertifolia	8,000
		—	35,000
	Southern Great Basin semi-desert grassland	*Achnatherum speciosum*	300
Dunes	North American warm desert dunes and sand flats	—	54,000
		Panicum urvilleanum	700
		Pleuraphis rigida	19,000
		Prosopis glandulosa coppice dunes	31,000
Grassland	California annual and perennial grassland	California annual and perennial grassland (native component) Mapping Unit	4,000
		—	5,000

Table III.7-15
Vegetation Types and Other Land Covers in the Mojave and Silurian Valley Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
	California annual forb/grass vegetation	*Amsinckia (menziesii, tessellata)*	200
		—	1,000
Riparian	Madrean warm semi-desert wash woodland/scrub	—	42,000
	Mojavean semi-desert wash scrub	*Ambrosia salsola*	4,000
		Brickellia incana	200
		Ephedra californica	3,000
		Ericameria paniculata	500
		Lepidospartum squamatum	600
	Sonoran–Coloradan semi-desert wash woodland/scrub	*Acacia greggii*	50
		Chilopsis linearis	600
		Prosopis glandulosa	10
		Psorothamnus spinosus	100
	Southwestern North American riparian evergreen and deciduous woodland	*Populus fremontii*	<10
	Southwestern North American riparian/wash scrub	*Baccharis sergiloides*	<10
		Tamarix spp.	1,000
Wetland	Californian warm temperate marsh/seep	*Juncus arcticus* (var. *balticus, mexicanus*)	10
	North American warm desert alkaline scrub and herb playa and wet flat	—	59,000
	Southwestern North American alkali marsh/seep vegetation	—	20
	Southwestern North American salt basin and high marsh	*Atriplex spinifera*	18,000
		Isocoma acradenia	20
		—	5,000
		Suaeda moquinii	6,000
	Lacustrine[2]	—	900

Table III.7-15
Vegetation Types and Other Land Covers in the Mojave and Silurian Valley Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
Other land covers	Agriculture	—	7,000
	Developed and Disturbed Areas	—	22,000
		Total	**2,647,000**

1 Only a portion of the DRECP Plan Area, approximately six million acres of the Mojave and Colorado/Sonoran deserts within Inyo, Kern, Los Angeles, San Bernardino, Riverside, and Imperial counties, has been mapped at the more specific alliance level.

2 This is a land cover type and not specifically a "vegetation type."

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

III.7.4.3.5 Owens River Valley Ecoregion Subarea

The vegetation types and other land covers within the Owens River Valley ecoregion subarea are detailed in Table III.7-16 and shown in Figure III.7-8.

Table III.7-16
Vegetation Types and Other Land Covers in the Owens River Valley Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
California forest and woodland	Californian broadleaf forest and woodland	—	30
	Californian montane conifer forest	—	40
Desert conifer woodlands	Great Basin pinyon–juniper woodland	—	500
Desert outcrop and badlands	North American warm desert bedrock cliff and outcrop	*Atriplex hymenelytra*	1,000
		—	57,000
Desert scrub	Intermontane deep or well-drained soil scrub	—	200
	Intermontane seral shrubland	—	1,000
	Intermountain dry shrubland and grassland	—	127,000

Table III.7-16
Vegetation Types and Other Land Covers in the Owens River Valley Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
	Intermountain mountain big sagebrush shrubland and steppe	—	9,000
	Lower bajada and fan Mojavean–Sonoran desert scrub	—	38,000
	Shadscale–saltbush cool semi-desert scrub	*Atriplex confertifolia*	3,000
		—	72,000
Dunes	North American warm desert dunes and sand flats	—	6,000
		Pleuraphis rigida	400
Riparian	Madrean warm semi-desert wash woodland/scrub	—	2,000
	Southwestern North American riparian/wash scrub	—	500
		Southwestern North American introduced riparian scrub	15,000
Wetland	Arid West freshwater emergent marsh	—	4,000
	Open water[2]	—	4,000
	Playa[2]	—	50,000
	Southwestern North American salt basin and high marsh	—	21,000
Other Land Covers	Agriculture	—	1,000
	Developed and disturbed Areas	—	4,000
	Rural	—	2,000
	Not mapped	—	1,000
		Total	**418,000**

1 Only a portion of the DRECP Plan Area, approximately six million acres of the Mojave and Colorado/Sonoran deserts within Inyo, Kern, Los Angeles, San Bernardino, Riverside, and Imperial counties, has been mapped at the more specific alliance level.

2 This is a land cover type and not specifically a "vegetation type."

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

III.7.4.3.6 Panamint Death Valley Ecoregion Subarea

The vegetation types and other land covers within the Panamint Death Valley ecoregion subarea are detailed in Table III.7-17 and shown in Figure III.7-9.

Table III.7-17
Vegetation Types and Other Land Covers
in the Panamint Death Valley Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
Chaparral and coastal scrub (Cismontane scrub)	Central and south coastal Californian coastal sage scrub	*Eriogonum fasciculatum*	900
Desert conifer woodlands	Great Basin pinyon–juniper woodland	—	800
		Pinus monophylla	300
Desert outcrop and badlands	North American warm desert bedrock cliff and outcrop	*Atriplex hymenelytra*	52,000
		—	41,000
Desert scrub	Intermontane deep or well-drained soil scrub	*Ephedra viridis*	50
		Ericameria teretifolia	100
		Grayia spinosa	10,000
		—	6,000
		Krascheninnikovia lanata	3,000
	Intermontane seral shrubland	*Gutierrezia sarothrae*	30
		—	800
	Intermountain dry shrubland and grassland	—	3,000
	Intermountain mountain big sagebrush shrubland and steppe	—	200
	Lower bajada and fan Mojavean–Sonoran desert scrub	*Ambrosia dumosa*	6,000
		Atriplex polycarpa	1,000
		Encelia farinosa	300
		Larrea tridentata	4,000
		Larrea tridentata–Ambrosia dumosa	117,000
		Larrea tridentata–Encelia farinosa	10
		—	1,388,000
	Mojave and Great Basin upper bajada and toeslope	—	10,000
		Salazaria mexicana	5,000

Table III.7-17
Vegetation Types and Other Land Covers in the Panamint Death Valley Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
	Shadscale–saltbush cool semi-desert scrub	*Atriplex confertifolia*	7,000
		—	15,000
Dunes	North American warm desert dunes and sand flats	—	18,000
		Prosopis glandulosa coppice dunes	21,000
Grassland	California annual and perennial grassland	Mediterranean California naturalized annual and perennial grassland	10
		California annual and perennial grassland (native component) Mapping Unit	60
Riparian	Madrean warm semi-desert wash woodland/scrub	—	38,000
	Mojavean semi-desert wash scrub	*Ambrosia salsola*	1,000
		Ericameria paniculata	100
		Lepidospartum squamatum	200
		—	<10
		Prunus fasciculata	30
	Sonoran–Coloradan semi-desert wash woodland/scrub	*Prosopis glandulosa*	60
	Southwestern North American riparian evergreen and deciduous woodland	*Populus fremontii*	<10
		Salix laevigata	<10
	Southwestern North American riparian/wash scrub	*Baccharis sergiloides*	<10
		Tamarix spp.	10
		Southwestern North American introduced riparian scrub	<10
Wetland	North American warm desert alkaline scrub and herb playa and wet flat	—	122,000
	Southwestern North American salt basin and high marsh	*Allenrolfea occidentalis*	10
		Atriplex spinifera	100
		—	39,000
		Suaeda moquinii	400

Table III.7-17
Vegetation Types and Other Land Covers
in the Panamint Death Valley Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
Other Land Covers	Developed and disturbed areas	—	27,000
	Not mapped	—	<10
		Total	**1,937,000**

[1] Only a portion of the DRECP Plan Area, approximately six million acres of the Mojave and Colorado/Sonoran deserts within Inyo, Kern, Los Angeles, San Bernardino, Riverside, and Imperial counties, has been mapped at the more specific alliance level.

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

III.7.4.3.7 Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

The vegetation types and other land covers within the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea are detailed in Table III.7-18 and shown in Figure III.7-10.

Table III.7-18
Vegetation Types and Other Land Covers in the Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
California forest and woodland	Californian broadleaf forest and woodland	—	20
	Californian montane conifer forest	—	38,000
Chaparral and coastal scrub (Cismontane scrub)	Californian xeric chaparral	—	4,000
	Central and south coastal California seral scrub	*Eriodictyon* (*crassifolium, trichocalyx*)	30
	Central and south coastal Californian coastal sage scrub	—	20
		Eriogonum fasciculatum	11,000
	Western Mojave and Western Sonoran Desert borderland chaparral	*Quercus cornelius-mulleri*	11,000
		—	30
Desert conifer woodlands	Great Basin pinyon–juniper woodland	*Cercocarpus ledifolius*	<10
		—	25,000
		Juniperus californica	35,000
		Pinus monophylla	21,000

Table III.7-18
Vegetation Types and Other Land Covers in the Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
Desert outcrop and badlands	North American warm desert bedrock cliff and outcrop	*Chorizanthe rigida–Geraea canescens*	27,000
		—	36,000
Desert Scrub	Arizonan upland Sonoran desert scrub	*Tetracoccus hallii*	20
		Viguiera parishii	39,000
	Intermontane deep or well-drained soil scrub	*Ephedra nevadensis*	1,000
		Ephedra viridis	12,000
		Ericameria teretifolia	3,000
		Grayia spinosa	15,000
		Purshia tridentate	1,000
	Intermontane seral shrubland	*Encelia (actoni, virginesis)*	6,000
		Ericameria nauseosa	2,000
		Gutierrezia sarothrae	50
	Intermountain dry shrubland and grassland	—	43,000
	Intermountain mountain big sagebrush shrubland and steppe	—	700
	Lower bajada and fan Mojavean–Sonoran desert scrub	*Ambrosia dumosa*	9,000
		Atriplex polycarpa	25,000
		Cylindropuntia bigelovii	80
		Encelia farinosa	8,000
		Larrea tridentata	86,000
		Larrea tridentata–Ambrosia dumosa	699,000
		Larrea tridentata–Encelia farinosa	141,000
		—	581,000
	Mojave and Great Basin upper bajada and toeslope	*Coleogyne ramosissima*	18,000
		Menodora spinescens	100
		—	22,000
		Salazaria mexicana	22,000
		Yucca brevifolia	76,000
		Yucca schidigera	73,000
	Shadscale–saltbush cool semi-desert scrub	*Atriplex canescens*	700
		Atriplex confertifolia	3,000
		—	400

Table III.7-18
Vegetation Types and Other Land Covers in the Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
Dunes	North American warm desert dunes and sand flats	*Dicoria canescens–Abronia villosa*	3,000
		—	12,000
		Pleuraphis rigida	500
		Prosopis glandulosa coppice dunes	900
Grassland	California annual and perennial grassland	*Bromus rubens–Schismus* (*arabicus, barbatus*)	5,000
		California annual and perennial grassland (native component) Mapping Unit	2,000
		Mediterranean California naturalized annual and perennial grassland	7,000
		—	30,000
	California annual forb/grass vegetation	*Amsinckia* (*menziesii, tessellata*)	10
Riparian	Madrean warm semi-desert wash woodland/scrub	—	11,000
	Mojavean semi-desert wash scrub	*Ambrosia salsola*	3,000
		Brickellia incana	40
		Ephedra californica	100
		Ericameria paniculata	500
		Lepidospartum squamatum	200
		Prunus fasciculata	800
	Riverine[2]	—	30
	Sonoran–Coloradan semi-desert wash woodland/scrub	*Acacia greggii*	18,000
		Chilopsis linearis	3,000
		Hyptis emoryi	4,000
		Parkinsonia florida–Olneya tesota	4,000
		Prosopis glandulosa	10
		Psorothamnus spinosus	6,000
	Southwestern North American riparian evergreen and deciduous woodland	*Populus fremontii*	200
		Salix gooddingii	<10
		Salix laevigata	10
		—	<10
		Washingtonia filifera	<10

Table III.7-18
Vegetation Types and Other Land Covers in the Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
	Southwestern North American riparian/wash scrub	*Forestiera pubescens*	<10
		Salix lasiolepis	10
		Tamarix spp.	300
		Southwestern North American introduced riparian scrub	700
Wetland	Arid West freshwater emergent marsh	*Typha (angustifolia, domingensis, latifolia)*	<10
	North American warm desert alkaline scrub and herb playa and wet flat	—	13,000
	Southwestern North American salt basin and high marsh	*Allenrolfea occidentalis*	400
		Atriplex lentiformis	70
		Suaeda moquinii	6,000
		—	1,000
	Wetland	Lacustrine[2]	100
Other land covers	Agriculture	—	3,000
	Developed and disturbed areas	—	74,000
	Rural	—	9,000
		Total	**2,316,000**

1 Only a portion of the DRECP Plan Area, approximately six million acres of the Mojave and Colorado/Sonoran deserts within Inyo, Kern, Los Angeles, San Bernardino, Riverside, and Imperial counties, has been mapped at the more specific alliance level.

2 This is a land cover type and not specifically a "vegetation type."

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

III.7.4.3.8 Piute Valley and Sacramento Mountains Ecoregion Subarea

The vegetation types and other land covers within the Piute Valley and Sacramento Mountains ecoregion subarea are detailed in Table III.7-19 and shown in Figure III.7-11.

Table III.7-19
Vegetation Types and Other Land Covers in the Piute Valley and Sacramento Mountains Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
Desert outcrop and badlands	North American warm desert bedrock cliff and outcrop	—	445,000
Desert scrub	Arizonan upland Sonoran desert scrub	—	6,000
	Intermountain dry shrubland and grassland	—	40
	Lower bajada and fan Mojavean–Sonoran desert scrub	—	520,000
		Larrea tridentata–Ambrosia dumosa	<10
		Larrea tridentata–Encelia farinosa	40
	Mojave and Great Basin upper bajada and toeslope	—	1,000
	Shadscale–saltbush cool semi-desert scrub	—	1,000
Dunes	North American warm desert dunes and sand flats	—	90
Riparian	Madrean warm semi-desert wash woodland/scrub	—	94,000
	Sonoran–Coloradan semi-desert wash woodland/scrub	—	50
	Southwestern North American riparian/wash scrub	Southwestern North American introduced riparian scrub	3,000
Wetland	Arid West freshwater emergent marsh	—	100
	Open water[2]	—	9,000
	Playa[2]	—	400
Other land covers	Agriculture	—	3,000
	Developed and disturbed areas	—	5,000
	Rural	—	3,000
	Not mapped	—	300
		Total	**1,092,000**

[1] Only a portion of the DRECP Plan Area, approximately six million acres of the Mojave and Colorado/Sonoran deserts within Inyo, Kern, Los Angeles, San Bernardino, Riverside, and Imperial counties, has been mapped at the more specific alliance level. None of the Piute Valley and Sacramento Mountains ecoregion subarea was mapped at the alliance level.

[2] This is a land cover type and not specifically a "vegetation type."

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the

nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

III.7.4.3.9 Providence and Bullion Mountains Ecoregion Subarea

The vegetation types and other land covers within the Providence and Bullion Mountains ecoregion subarea are detailed in Table III.7-20 and shown in Figure III.7-12.

Table III.7-20
Vegetation Types and Other Land Covers
in the Providence and Bullion Mountains Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
Desert conifer woodlands	Great Basin pinyon–juniper woodland	—	50,000
		Pinus monophylla	31,000
Desert outcrop and badlands	North American warm desert bedrock cliff and outcrop	*Atriplex hymenelytra*	10
		Chorizanthe rigida–Geraea canescens	100
		—	150,000
Desert scrub	Intermontane seral shrubland	—	10
	Intermountain dry shrubland and grassland	—	21,000
	Intermountain mountain big sagebrush shrubland and steppe	—	200
		Intermountain west mesic tall sagebrush shrubland and steppe	3,000
	Lower bajada and fan Mojavean–Sonoran desert scrub	*Atriplex polycarpa*	100
		Encelia farinosa	500
		Larrea tridentata	15,000
		Larrea tridentata–Ambrosia dumosa	26,000
		Larrea tridentata–Encelia farinosa	10,000
		—	1,767,000
	Mojave and Great Basin upper bajada and toeslope	—	353,000
	Shadscale–saltbush cool semi-desert scrub	*Atriplex canescens*	100
		—	14,000
Dunes	North American warm desert dunes and sand flats	*Dicoria canescens–Abronia villosa*	20
		—	9,000
		Pleuraphis rigida	5,000

Table III.7-20
Vegetation Types and Other Land Covers
in the Providence and Bullion Mountains Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
		Prosopis glandulosa coppice dunes	3,000
Riparian	Madrean warm semi-desert wash woodland/scrub	—	88,000
	Mojavean semi-desert wash scrub	*Ephedra californica*	100
		—	600
	Sonoran–Coloradan semi-desert wash woodland/scrub	*Acacia greggii*	1,000
		Hyptis emoryi	70
		Psorothamnus spinosus	700
	Southwestern North American riparian/wash scrub	Southwestern North American introduced riparian scrub	200
Wetland	North American warm desert alkaline scrub and herb playa and wet flat	—	56,000
	Southwestern North American salt basin and high marsh	—	50
		Suaeda moquinii	70
	Lacustrine[2]	—	<10
Other land covers	Agriculture	—	1,000
	Developed and disturbed areas	—	7,000
	Not mapped	—	<10
		Total	**2,615,000**

[1] Only a portion of the DRECP Plan Area, approximately six million acres of the Mojave and Colorado/Sonoran deserts within Inyo, Kern, Los Angeles, San Bernardino, Riverside, and Imperial counties, has been mapped at the more specific alliance level.

[2] This is a land cover type and not specifically a "vegetation type."

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

III.7.4.3.10 West Mojave and Eastern Slopes Ecoregion Subarea

The vegetation types and other land covers within the West Mojave and Eastern Slopes ecoregion subarea are detailed in Table III.7-21 and shown in Figure III.7-13.

Table III.7-21
Vegetation Types and Other Land Covers in the West Mojave and Eastern Slopes Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
California forest and woodland	Californian broadleaf forest and woodland	*Aesculus californica*	10
		Quercus chrysolepis tree	50
		Quercus lobata	100
		Quercus wislizeni tree	500
		—	71,000
	Californian evergreen coniferous forest and woodland	*Pinus sabiniana*	200
	Californian montane conifer forest	—	39,000
Chaparral and coastal scrub (Cismontane scrub)	Californian mesic chaparral	—	2,000
		Cercocarpus montanus	1,000
		Prunus ilicifolia	90
		Quercus berberidifolia	200
		Quercus berberidifolia–Adenostoma fasciculatum	200
	Californian pre-montane chaparral	*Arctostaphylos glandulosa*	30
		—	1,000
	Californian xeric chaparral	*Adenostoma fasciculatum*	9,000
		Arctostaphylos glauca	300
		Ceanothus crassifolius	<10
		Fremontodendron californicum	2,000
		—	9,000
	Central and south coastal California seral scrub	*Ericameria linearifolia*	500
		Eriodictyon (*crassifolium, trichocalyx*)	800
	Central and south coastal Californian coastal sage scrub	—	<10
		Eriogonum fasciculatum	39,000
		Eriogonum wrightii	10
	Western Mojave and Western Sonoran Desert borderland chaparral	*Quercus john-tuckeri*	13,000
		—	400

Table III.7-21
Vegetation Types and Other Land Covers in the West Mojave and Eastern Slopes Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
Desert conifer woodlands	Great Basin Pinyon–Juniper Woodland	*Juniperus californica*	55,000
		Pinus monophylla	1,000
		—	41,000
Desert outcrop and badlands	North American warm desert bedrock cliff and outcrop	*Atriplex hymenelytra*	900
		Chorizanthe rigida–Geraea canescens	300
		—	29,000
Desert scrub	Intermontane deep or well-drained soil scrub	*Ephedra nevadensis*	8,000
		Ephedra viridis	200
		Ericameria teretifolia	1,000
		Grayia spinosa	8,000
		Krascheninnikovia lanata	3,000
		Lycium cooperi	300
		Purshia tridentate	3,000
		—	100
	Intermontane seral shrubland	*Encelia (actoni, virginesis)*	90
		Ericameria cooperi	2,000
		Ericameria nauseosa	62,000
		—	500
	Intermountain dry shrubland and grassland	—	247,000
	Intermountain mountain big sagebrush shrubland and steppe	*Artemisia tridentata*	600
		—	58,000
	Lower bajada and fan Mojavean–Sonoran desert scrub	*Ambrosia dumosa*	86,000
		Atriplex polycarpa	193,000
		Larrea tridentata	124,000
		Larrea tridentata–Ambrosia dumosa	1,315,000
		—	82,000
	Mojave and Great Basin upper bajada and toeslope	*Coleogyne ramosissima*	15,000
		Salazaria mexicana	900
		Yucca brevifolia	107,000
		Yucca schidigera	1,000

Table III.7-21
Vegetation Types and Other Land Covers in the West Mojave and Eastern Slopes Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
	Shadscale–saltbush cool semi-desert scrub	*Atriplex canescens*	25,000
		Atriplex confertifolia	85,000
		—	8,000
	Southern Great Basin semi-desert grassland	*Achnatherum speciosum*	40
		—	40
Dunes	North American warm desert dunes and sand flats	*Achnatherum hymenoides*	600
		Pleuraphis rigida	1,000
		Prosopis glandulosa coppice dunes	1,000
		—	1,000
Grassland	California annual and perennial grassland	*Brassica nigra* and other mustards	100
		California annual and perennial grassland (native component) Mapping Unit	79,000
		Mediterranean California naturalized annual and perennial grassland	69,000
		—	23,000
	California annual forb/grass vegetation	*Amsinckia* (*menziesii, tessellata*)	90
		Eschscholzia (*californica*)	4,000
		Lasthenia californica–Plantago erecta–Vulpia microstachys	100
		—	3,000
Riparian	Madrean warm semi-desert wash woodland/scrub	—	7,000
	Mojavean semi-desert wash scrub	*Ambrosia salsola*	7,000
		Artemisia tridentata ssp. *parishii*	400
		Ephedra californica	700
		Ericameria paniculata	200

Table III.7-21
Vegetation Types and Other Land Covers in the West Mojave and Eastern Slopes Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
		Lepidospartum squamatum	5,000
		Prunus fasciculata	2,000
	Riverine[2]	—	200
	Sonoran–Coloradan semi-desert wash woodland/scrub	*Acacia greggii*	20
		Prosopis glandulosa	<10
	Southwestern North American riparian evergreen and deciduous woodland	*Alnus rhombifolia*	<10
		Platanus racemosa	100
		Populus fremontii	3,000
		Salix laevigata	300
		—	2,000
	Southwestern North American riparian/wash scrub	*Baccharis salicifolia*	200
		Forestiera pubescens	100
		Salix exigua	200
		Salix lasiolepis	60
		Sambucus nigra	70
		Tamarix spp.	4,000
		Southwestern North American introduced riparian scrub	1,000
Wetland	Arid West freshwater emergent marsh	—	20
		Typha (*angustifolia, domingensis, latifolia*)	100
	Californian warm temperate marsh/seep	*Juncus arcticus* (var. *balticus, mexicanus*)	400
	Intermountain basins alkaline-saline shrub wetland	*Sarcobatus vermiculatus*	30
	North American warm desert alkaline scrub and herb playa and wet flat	—	84,000
		Sarcobatus vermiculatus	30
	Open water[2]	—	30
	Southwestern North American salt basin and high marsh	*Allenrolfea occidentalis*	5,000
		Atriplex lentiformis	40
		Atriplex parryi	7,000
		Atriplex spinifera	159,000
		Distichlis spicata	400

Table III.7-21
Vegetation Types and Other Land Covers
in the West Mojave and Eastern Slopes Ecoregion Subarea of the DRECP

General Vegetation Types	Vegetation Type	Alliance[1]	Ecoregion Subarea Acres
		Frankenia salina	100
		Isocoma acradenia	10
		Sporobolus airoides	<10
		Suaeda moquinii	21,000
		Southwestern North American alkali marsh/seep vegetation	300
		—	900
	Wetland	Lacustrine[2]	7,000
Other land covers	Agriculture	—	60,000
	Developed and disturbed areas	—	264,000
	Rural		46,000
	Not mapped	—	500
		Total	**3,627,000**

[1] Only a portion of the DRECP Plan Area, approximately six million acres of the Mojave and Colorado/Sonoran deserts within Inyo, Kern, Los Angeles, San Bernardino, Riverside, and Imperial counties, has been mapped at the more specific alliance level.
[2] This is a land cover type and not specifically a "vegetation type."

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

III.7.5 Wildlife Resources Within the DRECP Plan Area

The diversity of vegetation types and floral richness within the DRECP Plan Area supports a high diversity of animal species. Desert scrub vegetation, which covers approximately 55% of the DRECP Plan Area, supports a diverse wildlife community that includes many species of birds, mammals, and reptiles that are distinctly representative of desert scrub. Generally these species either do not occur outside of the desert scrub vegetation type or if they do occur elsewhere, the desert is an important stronghold of their range or part of the life cycle (e.g., wintering habitat). Desert grasslands provide important habitat for a wide variety of birds, including raptors, insectivores, and granivores. Oak woodlands and forests provide important breeding and foraging habitat for a variety of species, particularly birds. Similarly, conifer forests provide important breeding and foraging habitat for many species that do not occur in lower elevation habitats; the relatively high proportion of dead and dying trees

typically found in high-elevation conifer forest provide habitat for birds that roost or nest in cavities and snags.

Riparian forests and desert washes provide nesting habitat for birds, including cavity nesters. The riparian and wetland habitats provide critical water, cover, shade, and abundant food resources (e.g., insects and other invertebrates) for migrating and resident bird species. Many bird, reptile, and mammal species that are not desert riparian or desert wash dependent often use these habitats for water and food resources.

Rocky, barren, and unvegetated habitat may include areas with sparse shrub cover that provide wildlife habitat. Several birds are associated with unvegetated and sparsely vegetated areas, and several bat species use rock outcrops and crevices for day roosting sites. Several reptile species and desert bighorn sheep are strongly associated with rocky habitats that provide refuge cover and escape terrain.

Agricultural fields, especially those in the Imperial Valley adjacent to the Salton Sea, attract a large number of birds that visit during migration and over winter, as well as birds that are resident year-round. Many of these species forage and rest in agricultural fields and associated canals and ditches, and trees associated with agricultural fields provide for cavity nesting. Although birds are by far the largest vertebrate group to use agricultural lands in the DRECP Plan Area, other vertebrate wildlife found in agricultural lands include mammals and some amphibians and reptiles. Urban or suburban environments also provide forage, roosting, and nesting opportunities for some of the Focus Species, primarily birds.

Higher biodiversity is associated with ecotones between various vegetation types and variation in geographic and geological factors, such as that between mountain, grassland, and desert habitat in the Mojave Desert (Vangergast et al. 2013). Vangergast et al. (2013) identified evolutionary hotspots, regions where multiple species sharing a similar distribution show spatial overlap in high genetic diversity and divergence, within the Mojave Desert by mapping spatial population genetic structure for 17 animal species. The 10 identified hotspots include (1) Dunmovin-Coso Junction, (2) Sierra-Tehachapi Transition, (3) Antelope Valley-Mojave Desert Transition, (4) Ord Mountains-Lucerne Valley, (5) Indio Hills-Little San Bernardino Mountains, (6) Pluvial Lakes (Bristol/Cadiz/Danby), (7) Colorado River Mountains (Mojave/Black mountains), (8) Sacramento-Detrital Valley, (9) Ivanpah Valley, and (10) Virgin Mountains (Vangergast et al. 2013).

Wildlife resources discussed in this section are organized by taxonomic group. Within each taxonomic group, many of the species occur only in the habitat types that meet some or all aspects of their life history requirements for reproduction, food, cover, migration or winter habitat, etc. The following discussion therefore organizes wildlife species within each taxonomic group by their typical or primary habitats. Some habitat generalists or

widespread species, however, may occur in more than one habitat type and therefore may be listed more than once in the discussion.

III.7.5.1 Invertebrates

The total number and diversity of arthropods and gastropods (snails and slugs), including crustaceans (e.g., fairy shrimp), insects, centipedes, millipedes, and arachnids, in the DRECP Plan Area is unknown and impossible to estimate because many groups of arthropods and gastropods have not been studied. However, studies have shown high species richness and endemism levels resulting from microhabitat specialization associated with unique substrates, host plants, and water sources (CDFG 2010a, as cited in Appendix Q). For example, more than 2,500 invertebrate taxa have been identified at the Deep Canyon Desert Research Center, which is primarily Colorado/Sonoran Desert on alluvial fan and rocky slopes, but also supports montane forest, chaparral, high desert plateau, pinyon–juniper woodland, ephemeral streams, and permanent waterholes (University of California–Riverside 2005, as cited in Appendix Q). With respect to endemism, 22 of 29 invertebrate taxa known from the Mojave Desert on the Special Animals List are endemic to the Mojave Desert (i.e., occur nowhere else) (CDFG 2010a, as cited in Appendix Q). Similarly, 8 of 15 invertebrate taxa known from the Colorado/Sonoran Desert on the Special Animals List are endemic to the Colorado/Sonoran Desert (CDFG 2010a, as cited in Appendix Q).

Dune systems also support several endemic invertebrate species. As stated in the Independent Science Advisors report (2010, as cited in Appendix Q), "The Kelso Dunes alone have 10 described endemic arthropods (eight beetles, a sand-treader cricket, and a Jerusalem cricket); the Algodones Dunes have eight (seven beetles, one sand-treader cricket); and every Southern California dune system that has received any level of taxonomic surveys has one or more endemic arthropods (at least 30 or 40 overall)."

Several invertebrate species documented in the different dune systems, including Kelso Dune glaresis scarab beetle (*Glaresis arenata*), Kelso Jerusalem cricket (*Ammopelmatus kelsoensis*), Kelso giant sand treader cricket (*Macrobaenetes kelsoensis*), Saline Valley snow-front June beetle (*Polyphylla anteronivea*), and brown-tassel trigonoscuta weevil (*Trigonoscuta brunnotesselata*) in the Mojave Desert. Invertebrates in the Sonoran Desert dune systems include Carlson's dune beetle (*Anomala carlsoni*), Hardy's dune beetle (*Anomala hardyorum*), and Andrew's dune scarab beetle (*Pseudocotalpa andrewsi*) (CDFG 2010b, as cited in Appendix Q).

Springs are small-scale aquatic systems that occur where groundwater reaches the surface (Meinzer 1923) with arid land springs considered distinct from springs in more temperate or humid regions as they are typically isolated from other waters (Abele 2011). Desert springs can act as "keystone" ecosystems playing an important role in evolutionary process

and regional biodiversity. Desert spring systems support a very diverse faunal assemblage including aquatic insects and also support the highest number of endemic taxa in North America (Stevens and Meretsky 2008, as cited in Henkanaththegedara 2012). Desert spring systems and its invertebrate fauna are under threat from a number of sources including water mining, habitat alterations, and the introduction of non-native species. In the DRECP Plan Area, the Nevares Spring naucorid bug (*Ambrysus funebris*), a candidate species proposed for federal listing, is found in the Travertine-Nevares Springs complex within Death Valley National Park (77 FR 69994-70060). There are several other endemic spring snail and naucorid bug species in the DRECP Plan Area.

III.7.5.2 Reptiles and Amphibians

Approximately 70 reptile and amphibian species have geographic ranges within the DRECP Plan Area. The largest group of reptiles is the snakes, which comprise about 27 species from the Boidae (boas), Colubridae (egg-laying snakes), Leptotyphlodipae (blind snakes), and Viperidae (vipers) families. The lizards comprise approximately 23 species from several families, including Anguidae (alligator lizards), Phrynosomatidae (horned, fringe-toed, spiny, sagebrush, and fence lizards), Iguanidae (chuckwalla (*Sauromalis ater*) and desert iguana (*Dipsosaurus dorsalis*), Crotophytidae (collared and leopard lizards), and Xantusidae (night lizards). There are four tortoise and turtle taxa with range in the DRECP Plan Area, including desert tortoise, western pond turtle (*Actinemys marmorata*), Sonora mud turtle (*Kinosternon sonoriense*), and spiny softshell (*Apalone* [=*Trionyx*] *spinera*). There are three gecko species (*Coleonyx* spp. and *Phyllodactylus xanti*) and two skink species (*Eumeces* spp.) with ranges in the DRECP Plan Area. Although the DRECP Plan Area is arid, about 14 amphibian species occur, including several salamanders (Salamandridae [newts] and Plethodontidae [lungless salamanders]), spadefoot toads (Pelobatidae), true toads (Bufonidae), tree frogs (Hylidae), and true frogs (Ranidae).

Reptiles occurring in dunes, like dune plant species, often are uniquely adapted to the dune environment. Fringe-toed lizards (*Uma* spp.) have morphological adaptations to living on fine sands, including velvety skin, fringed toes with projecting point scales, a countersunk lower jaw, earflaps, and camouflage (Stebbins 1985, as cited in Appendix Q). The three species in the Mojave and Colorado/Sonoran deserts are endemic to different dune systems: (1) the Colorado Desert fringe-toed lizard (*Uma notata*) occurs throughout the Colorado/Sonoran Desert; (2) the Mojave fringe-toed lizard (*Uma scoparia*) occurs in the Mojave Desert north to the southern end of Death Valley and south to about Parker, Arizona; (3) and the Coachella Valley fringe-toed lizard (*Uma inornata*) occurs in the Coachella Valley of the Colorado/Sonoran Desert (outside of the DRECP Plan Area) (Stebbins 1985, as cited in Appendix Q).

Desert grasslands, including grassland/shrubland mosaics and shrub steppe vegetation types, provide habitat for several reptile species, but these species also occur in other vegetation as well that provides cover, prey, and refuge (e.g., rocks, burrows, and debris). Snakes commonly occurring in desert grasslands include night snake (*Hypsiglena torquata*), California kingsnake (*Lampropeltis getula californiae*), coachwhip (*Masticophis flagellum*), gophersnake (*Pituophis cantifer*), long-nosed snake (*Rhinocheilus lecontei*), western patch-nosed snake (*Salvadora hexalepis*), groundsnake (*Sonora semiannulata),* western diamond-backed rattlesnake (*Crotalus atrox*), and Mohave rattlesnake (*Crotalus scutulatus*). These snakes primarily prey on lizards, small mammals, smaller snakes, nesting birds, and amphibians. Fewer lizards occupy grasslands, but include side-blotched lizard (*Uta stansburiana*), long-nosed leopard lizard (*Gambelia wislizenii*), western fence lizard (*Sceloporus cowlesi*), and desert spiny lizard (*Sceloporus magister*).

A variety of reptile species occupy the desert scrub and woodlands in the DRECP Plan Area. Desert tortoise occurs throughout most of the undisturbed and less disturbed lands of the DRECP Plan Area. Other reptile species commonly occurring in both the Mojave and Colorado/Sonoran deserts include common chuckwalla, desert horned lizard (*Phrynosoma platyrhinos*), desert iguana, desert spiny lizard, long-nosed leopard lizard, zebra-tailed lizard (*Callisaurus draconoides*), western groundsnake (*Sonora semiannulata*), western shovelnose snake (*Chionactis occipitalis*), and sidewinder (*Crotalus cerastes*). The Great Basin collared lizard (*Crotaphytus bincinctores*) occurs in the Mojave Desert and northeastern portion of the Sonoran Desert. Species generally restricted to the Mojave Desert include desert night lizard (*Xantusia vigilis*) and Mojave rattlesnake. Species mostly limited to the Colorado/Sonoran Desert include flat-tailed horned lizard (*Phrynosoma mcallii*) and western diamond-backed rattlesnake. The Gila monster (*Heloderma suspectum*) is restricted to a small area in northeastern San Bernardino County. Although some of these species are geographically widespread and common, they occur patchily within their range in specific microhabitats. For example, sidewinders often occur in sandy washes and windblown sand areas where they can burrow under the sand and wait for prey. The chuckwalla, on the other hand, is mostly restricted to the cover of rocky and boulder-strewn habitats. Generally, reptiles can be characterized as species associated either with flatter, open terrain with sandy soils (e.g., desert horned lizard, desert spiny lizard, long-nosed leopard lizard, zebra-tailed lizard, and Mojave rattlesnake) or with rocky and/or brushy and woody areas (e.g., chuckwalla, Great Basin collared lizard, desert night lizard, and western diamond-backed rattlesnake). Reptiles closely associated with rocky areas include chuckwalla, Great Basin collared lizard, rosy boa (*Lichanura trivirgata),* and speckled rattlesnake (*Crotalus mitchellii*).

Common reptiles found in coastal scrub and chaparral habitats include common kingsnake (*Lampropeltis getula*), western rattlesnake (*Crotalus viridis helleri*), coachwhip, gophersnake, western fence lizard, western whiptail (*Aspidoscelis tigris*), and side-blotched lizard.

Common reptiles occurring in coniferous habitats within the DRECP Plan Area include California kingsnake, California mountain kingsnake (*Lampropeltis zonata*), western rattlesnake, gophersnake, common gartersnake (*Thamnophis sirtalis*), western fence lizard, and side-blotched lizard, several of which are also common at lower elevations. Uncommon reptiles and amphibians occurring at higher elevations and associated with coniferous forests include southern rubber boa (*Charina umbratica*) and Sierra Madre yellow-legged frog.

Common amphibians found in desert riparian and desert wash habitats include Woodhouse's toad (*Anaxyrus woodhousii*), red-spotted toad (*Anaxyrus punctatus*), great plains toad (*Bufo cognatus*), Baja California treefrog (*Pseudacris hypochondriaca*), and Rio Grande leopard frog (*Lithobathes berlandieri*; introduced in Lower Colorado River and Imperial County area). Less common amphibians associated with desert riparian and wash habitats include Sonoran desert toad (*Ollotis alvaria*; previously called Colorado River toad [*Bufo alvarius*]), Arizona toad (*Anaxyrus microscaphus*), and Couch's spadefoot (*Scaphiopus couchii*). The California range of the Sonoran desert toad is limited to the extreme southeast portion of the state, but the species' range extends east into southern Arizona, and south and southeast into Baja California and Sinaloa, Mexico. This species has not been collected since 1955 and may be extirpated from California (Jennings and Hayes 1994, as cited in Appendix Q). Couch's spadefoot is known from scattered locations east of the Algodones Dunes and north into San Bernardino County (CaliforniaHerps 2011, as cited in Appendix Q).

Amphibians expected to use marsh habitats in the DRECP Plan Area include Baja California treefrog, American bullfrog (*Lithobates catesbeianus*), Woodhouse's toad, and possibly Sonoran desert toad. The Baja California treefrog and bullfrog are widespread in most aquatic habitats in much of California, including desert areas. Woodhouse's toad occurs along the lower Colorado River, in orchards between Indio and the Salton Sea, and in irrigated lands in the Imperial Valley (Zeiner et al. 1988, as cited in Appendix Q). The Colorado River toad is uncommon in the lower Colorado River area and irrigated areas of Imperial County (Zeiner et al. 1988, as cited in Appendix Q).

Agricultural operations provide aquatic breeding and foraging habitat for amphibians, and several common and at least two invasive species occur in the DRECP Plan Area. Ponds and irrigation ditches provide suitable aquatic breeding habitat and the adjacent fields provide abundant invertebrate prey taken by amphibians, including grasshoppers, crickets, moths, caterpillars, beetles, ants, sow bugs, scorpions, centipedes, and spiders. The native amphibian species that occur in ponds and irrigation ditches in agricultural areas are primarily limited to the Imperial Valley and lower Colorado River, and include Woodhouse's toad, great plains toad, and Couch's spadefoot (lower Colorado River). The non-native Rio Grande leopard frog, which is native to Texas, New Mexico, and Mexico, may

have been accidentally introduced in the Yuma area between 1965 and 1971 as a result of fish stocking and has expanded its range into the agricultural areas of the Imperial Valley (California Herps 2011, as cited in Appendix Q). The American bullfrog, which is not native to California, occurs throughout the DRECP Plan Area in suitable habitat.

Agricultural areas also support a limited number of reptile species that may be attracted to agricultural areas for small rodent prey and larger invertebrates, especially if the agricultural area is adjacent to natural habitat that provides adequate refuge and shade (e.g., rocks, shrubs). Snakes in particular are highly vulnerable to mortality from farm equipment, vehicle collisions, and pest control and eradication practices. Snakes that may sometimes occur in agricultural areas, especially areas with grasses, include California kingsnake, coachwhip, gophersnake, groundsnake, checkered gartersnake (*Thamnophis marcianus*), and western diamond-backed rattlesnake. The side-blotched lizard is the only lizard expected to commonly use agricultural areas for foraging and refuge (e.g., in rodent burrows), but some other common lizard species that occur in desert scrub and wash habitats may occasionally forage along the ecotone between natural habitat and agriculture.

III.7.5.3 Birds

Birds constitute a very large component of the faunal richness and diversity of the DRECP Plan Area, in large part because of the Salton Sea, Colorado River, and adjacent irrigated agricultural fields that attract large numbers of birds during migration and for wintering. Even excluding the Salton Sea and adjacent agricultural lands, the BLM California Desert Checklist of Birds (Foreman and Nicolai 2011, as cited in Appendix Q) includes almost 300 species representing about 39 separate taxonomic groups, such as hawks, kites, eagles, owls, hummingbirds, woodpeckers, rails, swallows, finches, sparrows, vireos, flycatchers, and other passerines. Of these approximately 300 species, a much smaller number are commonly found in the most arid habitats that make up the vast majority of the DRECP Plan Area where food and water or vegetation is not available. The numbers and variety of these species typically found within the DRECP Plan Area vary greatly depending on habitat type as discussed in the following subsection.

III.7.5.3.1 Birds of Prey

Birds of prey include raptors (hawks, falcons, eagles, kites, osprey, and owls), vultures, and condors. Raptors forage on a variety of prey, including small mammals, reptiles, other birds, fish, invertebrates, and, for some species, carrion (Venable 1996; BLM and DOE 2010, as cited in Appendix Q). They typically perch on trees, utility support structures, fences, and other high structures that provide a broad view of the surrounding topography, and they may soar for extended periods at relatively high altitudes. Raptors forage from either a perch or on the wing (depending on the species) and forage during the day. Owls also perch on elevated structures and forage on a variety of prey, including

mammals, birds, and insects (Venable 1996; BLM and DOE 2010, as cited in Appendix Q). Forest-dwelling species typically forage by diving on prey from a perch, while open-country species hunt on the wing while flying low over the ground. While generally nocturnal, some owl species are also active during the day. Raptors that forage in the desert grasslands include golden eagle (*Aquila chrysaetos*), ferruginous hawk (*Buteo regalis*), northern harrier (*Circus cyaneus*), Swainson's hawk (*Buteo swainsoni*), red-tailed hawk (*Buteo jamaicensis*), prairie falcon (*Falco mexicanus*), American kestrel (*Falco sparverius*), merlin (*F. columbarius*), burrowing owl (*Athene cunicularia*), short-eared owl (*Asio flammeus*), and great horned owl (*Bubo virginianus*). The larger species such as golden eagle, red-tailed hawk, and great horned owl primarily prey on rodents, lagomorphs, and reptiles, and the smaller species such as American kestrel, burrowing owl, and short-eared owl include smaller rodents, reptiles, amphibians, small birds, and larger insects in their diet. Marsh habitats with dense stands of cattail (*Typha* spp.) provide nesting habitat for ground-nesting raptors such as northern harrier.

Secluded rock outcrops and ledges provide nesting habitat for many birds of prey, including golden eagle and prairie falcon. In addition, large trees, including oak, pine, juniper, cottonwood, and Joshua trees, provide nesting and roosting habitat for several raptors, including golden eagle, red-tailed hawk, red-shouldered hawk (*Buteo lineatus*), and American kestrel. Playas are fairly devoid of vegetation due to highly alkaline soils, but they do provide unique and important seasonal wetland resources for a variety of migratory and wintering birds. Northern harrier, peregrine falcon, and short-eared owl, for example, occur where migratory and wintering waterfowl and shorebirds are attracted to these wetland resources (National Audubon Society 2011; BLM 2007, as cited in Appendix Q).

The canals and drainage ditches in the Imperial Valley also provide extremely important habitat for the burrowing owl, which supports the largest breeding population of that species in California. There were an estimated 5,600 pairs (range 3,405 to 7,795) in Imperial Valley during 1992 and 1993 (Gervais et al. 2008, as cited in Appendix Q). This estimate dropped to 4,879 pairs in 2007 and 3,557 pairs in 2008 and increased to between 4,589 and 5,058 pairs in 2011 (Manning 2009; AECOM 2012, as cited in Appendix Q). Burrowing owls in this region nest along the soft earthen embankments of canals and ditches and roads in areas surrounded by crops, and about 80% of foraging occurs within about 1,950 feet of the nest burrow (Gervais et al. 2008, as cited in Appendix Q).

In addition to burrowing owl and American kestrel, other raptors that commonly forage in agricultural fields include barn owl (*Tyto alba*), great horned owl, and northern harrier, as well as less commonly occurring raptors such as merlin and ferruginous hawk (Patten et al. 2003). While Swainson's hawk nest and forage within the agricultural fields of the Antelope Valley, Patten et al. (2003) note an increase in the number of migrant Swainson's hawk observed foraging in the Imperial Valley. Rodents, including ground squirrels and pocket

gophers (*Thomomys bottae*), and large invertebrates may be abundant on agricultural lands and attract foraging raptors.

III.7.5.3.2 Waterfowl, Wading Birds, and Shorebirds

Waterfowl (ducks, geese, and swans), wading birds (herons and cranes), and shorebirds (plovers, sandpipers, and similar birds) are found in the DRECP Plan Area. Many of these species exhibit extensive migrations from breeding areas in Alaska and Canada to wintering grounds in Mexico and southward (Lincoln et al. 1998).

Playas are fairly devoid of vegetation due to highly alkaline soils but do provide unique and important seasonal wetland resources for a variety of migratory and wintering birds. For example, Searles Dry Lake east of Trona and Koehn Dry Lake northeast of California City have spring-fed wetlands that expand with winter rains to produce highly productive alkali meadows and mudflats (National Audubon Society 2011). Owens Lake near Lone Pine and Harper Dry Lake near Barstow also provides wetland habitat for birds (BLM 2007, as cited in Appendix Q; National Audubon Society 2011). Thousands of migratory and wintering waterfowl and shorebirds are attracted to these wetland resources, including phalaropes (*Phalaropus* spp.), teal and pintail (*Anas* spp.), eared grebe (*Podiceps nigricollis*), American white pelican (*Pelecanus erythrorhynchos*), herons and egrets (Ardeidae), killdeer (*Charadrius vociferus*), stilts and avocets (Recurvirostridae), and white-faced ibis (*Plegadis chihi*) (National Audubon Society 2011; BLM 2007, as cited in Appendix Q). Snowy plover (*Charadrius alexandrinus*) has been documented to nest at Harper Dry Lake and Searles Dry Lake (Garrett and Dunn 1981; National Audubon Society 2011).

The Salton Sea supports some of the highest levels of avian biodiversity in the southwestern United States and is important in providing habitat for migrating and resident waterbirds, particularly Pacific Flyway waterbirds. More than 400 resident, migratory, and special-status bird species have been recorded in the Salton Sea area since its formation, with about 270 of those species using the Salton Sea on a fairly regular basis. Common aquatic birds found within the Salton Sea include American avocet (*Recurvirostra americana*), American coot (*Fulica americana*), American wigeon (*Anas americana*), American white pelican (*Pelecanus erythrorhynchos*), black-necked stilt (*Himantopus mexicanus*), California brown pelican (*Pelecanus occidentalis*), eared grebe (*Podiceps nigricollis*), and ruddy duck (*Oxyura jamaicensis*). The Caspian tern (*Hydroprogne caspia*) is a common breeding bird that occurs within the Salton Sea region from mid-April through October. It is most abundant at the Sea from late summer through fall. Most Caspian terns depart from the region by the end of October, but some remain through the winter (Patten et al. 2003). The double-crested cormorant (*Phalacrocorax auritus*) is a year-round resident of the Salton Sea with the highest counts occurring in November, December, and February; however, populations remain steadily in the thousands throughout the year.

They nest regularly at the Salton Sea. The Salton Sea is the only area where the laughing gull occurs regularly in the western United States. The long-billed curlew (*Numenius americanus*) is present throughout the year at the Salton Sea, but thousands occur in the Imperial Valley in the winter. The Salton Sea is an important migratory stopover for the black tern (*Chlidonias niger*), but it does not breed there (Patten et al. 2003). The California brown pelican (*Pelecanus occidentalis californicus*) occurs at the Salton Sea as newly fledged young and post-breeding adults as they disperse from nesting areas in Baja California. The American white pelican (*Pelecanus erythrorhynchos*) formerly bred at the Salton Sea up to the 1950s but occurs now as a migrant and winter resident.

Marsh habitats with dense stands of cattail provide nesting habitat for several bird species in the DRECP Plan Area, including least bittern (*Ixobrychus exilis*), Yuma Ridgway's rail (*Rallus obsoletus yumanensis*), black rail (*Laterallus jamaicensis*), redhead (*Aythya americana*), ruddy duck, common moorhen (*Gallinula chloropus*), and American coot (*Fulica americana*) (Patten et al. 2003). Marsh habitats also provide foraging and/or resting and loafing habitat for many more avian taxa such as grebes (Podicipedidae); herons, bitterns, and allies; ibises and spoonbills (Threskiornithidae), including white-faced ibis; ducks and geese (Anatidae), including uncommon species such as wood duck (*Aix sponsa*); rails (Gruiformes) such as Virginia rail (*Rallus limicola*) and sora (*Porzana carolina*); stilts and avocets; sandpipers (Scolopacidae) such as solitary sandpiper (*Tringa solitaria*), western sandpiper (*Calidris mauri*), short-billed dowitcher (*Limnodromus griseus*), long-billed dowitcher (*Limnodromus scolopaceus*), and Wilson's snipe (*Gallinago delicata*) (Garrett and Dunn 1981, as cited in Appendix Q).

The irrigated agricultural fields and associated canals and ditches in the Imperial Valley attract a large number of birds that visit the Salton Sea during migration and for wintering. Food sources in these agricultural fields can be abundant, especially when disking or grazing unearths or flushes various terrestrial insects, such as crickets, grubs, and grasshoppers. Fourteen of the 20 most abundant taxa in agricultural fields were shorebirds (Shuford et al. 2000, as cited in Appendix Q). Agricultural fields with a grass component were the most frequently used, accounting for 39% of all birds, followed by alfalfa fields with 31% and bare fields with 24% of birds. Most of the activity in the fields was feeding (65%), followed by resting (23%), and flying (10%) (Shuford et al. 2000, as cited in Appendix Q). Periodic burning of fields, such as asparagus, provides particularly valuable habitat for wintering mountain plovers (*Charadrius montanus*). Flooded agricultural fields support numerous species of shorebirds including cattle egrets, white-faced ibis, and ring-billed gulls (Shuford et al. 2003 and Warnock et al. 2003, cited in Patten et al. 2003).

Two dominant species observed in the northern Imperial Valley in 1999 were ring-billed gull (*Larus delawarensis*) (12,092 individuals) and cattle egret (*Bubulcus ibis*) (10,862 individuals) (Shuford et al. 2000, as cited in Appendix Q). Other relatively common species

detected (i.e., more than 100 individuals counted), in descending order of abundance, were white-faced ibis, snow/Ross's goose (*Chen* spp.), long-billed curlew (*Numenius americanus*), black-necked stilt (*Himantopus mexicanus*), black tern (*Chlidonias niger*), killdeer, laughing gull (*Leucophaeus atricilla*), least sandpiper (*Calidris minutilla*), black-bellied plover (*Pluvialis squatarola*), whimbrel (*Numenius phaeopus*), Wilson's phalarope (*Phalaropus tricolor*), and greater yellowlegs (*Tringa melanoleuca*).

The Palo Verde Valley in the Blythe area supports about 108,000 acres of agricultural lands (Barrows 2007, as cited in Appendix Q). Although fewer numbers of birds are likely to use these agricultural areas compared to the Imperial Valley, the close proximity of the Palo Verde Valley to the Colorado River makes this area an important migration route and the agricultural fields in the area provide important habitat for migrant shorebirds when flooded, including large numbers of mountain plover, whimbrel (numbering up to 10,000 in the spring), and long-billed curlew (National Audubon Society 2011b, as cited in Appendix Q).

III.7.5.3.3 Other Birds

Many other bird species representing a large diversity of taxa occur in the DRECP Plan Area. Therefore, as with reptiles and amphibians, this section is organized by their primary habitat associations.

Many bird species nest in desert riparian habitats in the DRECP Plan Area, including southwestern willow flycatcher (*Empidonax traillii extimus*), Bell's vireo (*Vireo bellii pusillus*), Lucy's warbler (*Oreothlypis luciae*), yellow warbler (*Setophoaga petechia*), yellow-breasted chat (*Icteria virens*), common yellowthroat (*Geothlypis trichas*), summer tanager (*Piranga rubra*), blue grosbeak (*Passerina caerulea*), and song sparrow (*Melospiza melodia*). Other species are migrants or winter visitors in desert riparian habitats, including vesper sparrow (*Pooecetes gramineus*) and lark sparrow (*Chondestes grammacus*).

Bird species occurring in both desert riparian and desert wash include Gila woodpecker (*Melanerpes uropygialis*), ash-throated flycatcher (*Myiarchus cinerascens*), crissal thrasher (*Toxostoma crissale)*, orange-crowned warbler (*Oreothlypis celata*), Gambel's quail (*Callipepla gambelii*), common nighthawk (*Chordeiles minor*), verdin (*Auriparus flaviceps*), green-tailed towhee (*Pipilo chlorurus*), Abert's towhee (*Melozone aberti*), and gilded flicker (*Colaptes chrysoides*).

Several birds are associated with unvegetated and sparsely vegetated areas. The rock wren (*Salpinctes obsoletus*) uses rock outcrops, talus slopes, cliffs, and banks where it gleans spiders, insects, and other small invertebrates from rocks and crevices and also nests under large rocks or in cavities and crevices among the rocks. The canyon wren (*Catherpes mexicanus*) also occurs in rocky canyons and gleans spiders, insects, and other small invertebrates and nests on rock ledges, shelves, and crevices, usually near water. Cliff

swallows (*Petrochelidon pyrrhonota*) build mud nests on rock overhangs and cliffs, but a source of mud must be nearby; this species is not widespread in the DRECP Plan Area.

Bird species typically considered to be "desert species" and which commonly occur in desert scrub include Gambel's quail, white-winged dove (*Zenaida asiatica*), greater roadrunner (*Geococcyx californianus*), common poorwill (*Phalaenoptilus nuttallii*), Costa's hummingbird (*Calypte costae*), verdin, cactus wren (*Campylorhynchus brunneicapillus*), black-tailed gnatcatcher (*Polioptila melanura*), LeConte's thrasher (*Toxostoma lecontei*), green-tailed towhee (winter range), Abert's towhee, Brewer's sparrow (*Spizella breweri*; winter range), and black-throated sparrow (*Amphispiza bilineata*). Bendire's thrasher (*Toxostoma bendirei*) occurs locally in Joshua tree woodland, as well as desert succulent scrub. Though cosmopolitan in distribution, mourning doves (*Zenaida macroura*) are common in desert habitats. The Eurasian collared-dove (*Streptopelia decaocto*), most often simply called the collared dove, is a species native to Asia and Europe, and recently introduced to North America. This species is expanding its range in California including the DRECP Plan Area.

The more mesic coastal scrub and chaparral vegetation types have a limited distribution in the DRECP Plan Area and tend to occur at the mid-elevations of the mountain ranges that bound the desert portions of the DRECP Plan Area. Year-round resident species that typically are only found in the scrub and chaparral vegetation types include California quail (*Callipepla californica*), California thrasher (*Toxostoma redivivum*), wren-tit (*Chamaea fasciata*), California towhee (*Melozone crissalis*), spotted towhee (*Pipilo maculatus*), rufous-crowned sparrow (*Aimophila ruficeps*), and black-chinned sparrow (*Spizella atrogularis*).

Bird species typical of pinyon–juniper woodland, but also commonly found in other vegetation types within the DRECP Plan Area, include Brewer's sparrow, black-chinned hummingbird (*Archilochus alexandri*), western scrub-jay (*Aphelocoma californica*), oak titmouse (*Baeolophus inornatus*), bushtit (*Psaltriparus minimus*), Bewick's wren (*Thryomanes bewickii*), crissal thrasher, gray-headed junco (*Junco hyemalis caniceps*), ladder-backed woodpecker (*Picoides scalaris*), ash-throated flycatcher, Cassin's kingbird (*Tyrannus vociferans*), mountain chickadee (*Poecile gambeli*; at higher elevations), blue-gray gnatcatcher (*Polioptila caerulea*), black-throated gray warbler (*Setophaga nigrescens*), and Scott's oriole (*Icterus parisorum*). Species somewhat limited to pinyon–juniper woodland include pinyon jay (*Gymnorhinus cyanocephalus*), which breeds in pinyon but may forage in shrublands and grassland; juniper titmouse (*Baeolophus ridgwayi*), which occurs in the north and northeastern portions of the Mojave Desert; hepatic tanager (*Piranga flava*), which is a rare summer resident in pinyon woodland on Clark Mountain, in the Kingston Mountains, the New York Mountains, and the northeastern San Bernardino Mountains; and gray vireo (*Vireo vicinior*), which also requires dense stands of chaparral near pinyon–juniper woodlands (Garrett and Dunn 1981; Small 1974, as cited in Appendix Q).

Birds characteristic of oak woodlands and forests include acorn woodpecker (*Melanerpes formicivorus*), Nuttall's woodpecker (*Picoides nuttallii*), northern flicker (*Colaptes auratus*), white-breasted nuthatch (*Sitta carolinensis*), western scrub-jay, oak titmouse, band-tailed pigeon (*Patagioenas fasciata*), and Hutton's vireo (*Vireo huttoni*) (Small 1974, as cited in Appendix Q). Acorns are an important food source for several common bird species, including acorn woodpecker, western scrub-jay, and oak titmouse. Caching of acorns by scrub jays also promotes oak regeneration and recruitment.

Due to the relatively small amount of conifer forest in the DRECP Plan Area, the wildlife populations dependent on coniferous habitats probably are relatively small, but several bird species common in coniferous habitats include Steller's jay (*Cyanocitta stelleri*), Clark's nutcracker (*Nucifraga columbiana*), pinyon jay, and mountain chickadee. Conifers also provide a large insect prey base for many bird species, including a variety of warblers.

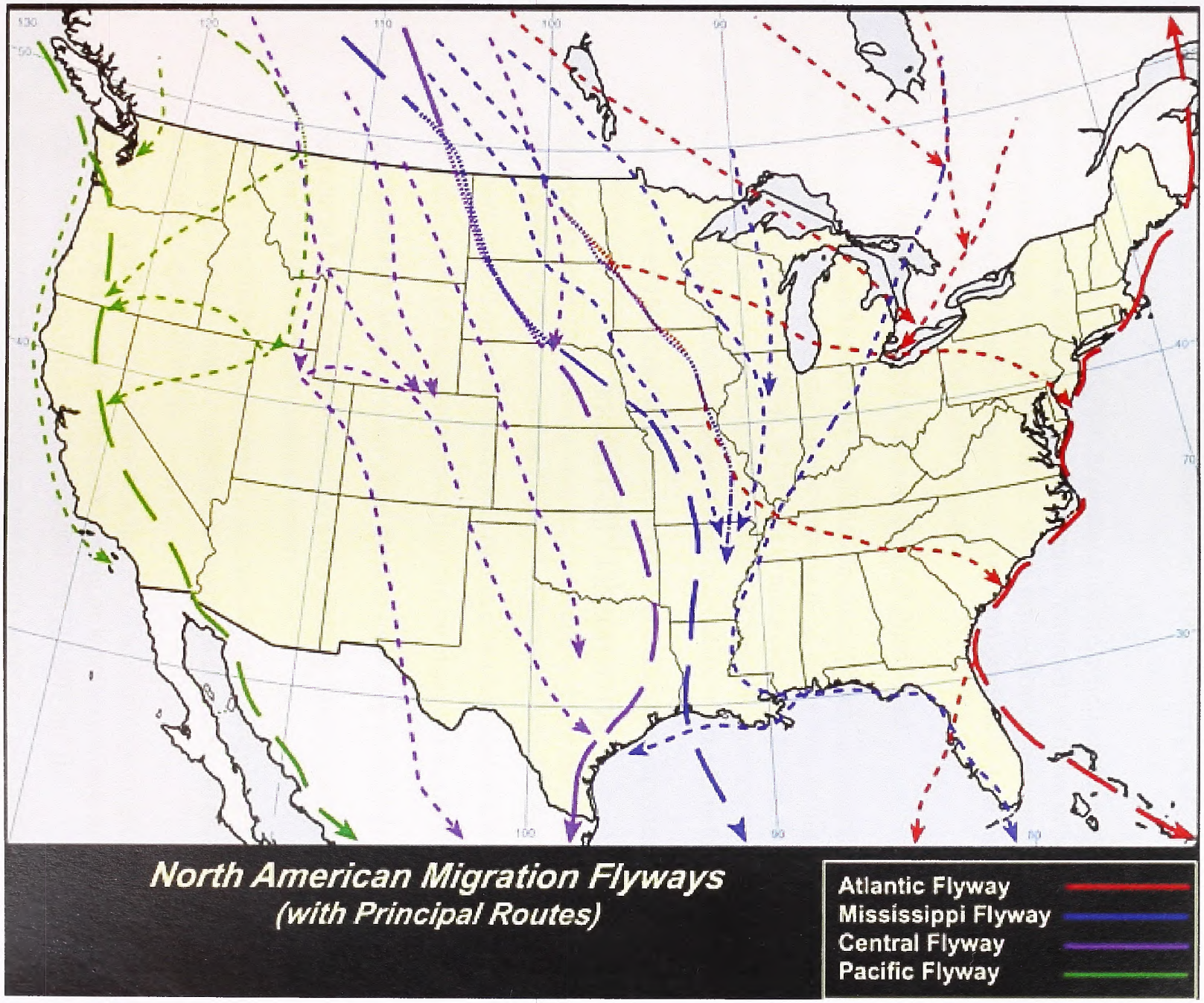
III.7.5.3.4 Upland Game Birds

Upland game birds regulated by CDFW include ring-necked pheasant (*Phasianus colchicus*), quail (*Callipepla* spp.), chukar (*Alectoris chukar*), sage grouse (*Centrocercus* spp.) sooty and ruffed grouse (*Dendragapus* spp.), white-tailed ptarmigan (*Lagopus leucura*), wild turkey (*Meleagris gallopavo*), band-tailed pigeon, doves (*Zenaida* and *Streptopelia* spp.), and Wilson's snipe (CDFG 2012b). Although American crow (*Corvus brachyrhynchos*) is defined as a nongame bird under California state laws and regulations, take is allowed under both hunting and depredation and nuisance provisions. Greater sage-grouse (*Centrocercus urophasianus*), Gambel's quail, California quail, mourning dove, and white-winged dove are all native to California, while ring-necked pheasant, chukar, and wild turkey have been introduced (BLM and DOE 2010).

Upland game species that occur year-round within the DRECP Plan Area include Gambel's quail and numerous dove species common within the Colorado/Sonoran and Mojave desert areas of California (BLM and DOE 2010), ring-necked pheasant in the Imperial Valley within the agricultural complex south of the Salton Sea, chukar within the Mojave Desert as far south as San Bernardino County, Wilson's snipe in the Imperial Valley within the agricultural complex south of the Salton Sea and along the Colorado River, and the American crow at two locations along the Colorado River (Zeiner et al. 1989).

III.7.5.3.5 Migratory Birds and Routes

Many of the bird species occurring in the DRECP Plan Area are seasonal residents or migrants. The DRECP Plan Area falls within the Pacific Flyway, one of the four major North American migration flyways (Lincoln et al. 1998; Figure III.7-14). This pathway is used in spring by birds migrating north from wintering areas to breeding grounds and in fall by birds migrating south to wintering areas. The Pacific Flyway includes the Pacific Coast Route, which occurs between the Rocky Mountains and the Pacific coast of the United States.



Sources: http://www.birdnature.com/

FIGURE III.7-14

North American Migration Flyways

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The southward route of the long-distance migratory landbirds of the Pacific area extends chiefly through the interior of California to the mouth of the Colorado River and on to winter quarters in western Mexico (Lincoln et al. 1998). The Salton Sea is a crucial stopover site on the Pacific Flyway (Page et al. 1992; Shuford et al. 1999, 2002, and 2003, as cited in Patten et al. 2003).

The species within the DRECP Plan Area that migrate, whether through short-range migration or species that undergo migrations of hundreds of miles or more, are protected by various regulations such as the MBTA; these protections are discussed in Section III.7.1. Some of these species remain relatively solitary throughout the year, while others occur in small to large flocks at various times of year.

III.7.5.3.6 Important Bird Areas in DRECP Plan Area

The National Audubon Society has identified Important Bird Areas globally and throughout California that provide essential habitat for breeding, wintering, or migrating birds (National Audubon Society 2008). While these sites can vary in size, they are discrete areas noticeable within the surrounding landscapes. California Important Bird Areas are defined as biogeographically distinct subregions that meet at least one of the following criteria:

- Support over 1% of the global or 10% of the California population of one or more sensitive species (breeding or wintering).
- Support at least 10 sensitive species (federally or state-listed threatened or endangered species as well as California Species of Special Concern).
- Support 10,000 or more shorebirds that can be observed in one day.
- Support 5,000 or more waterfowl that can be observed in one day.

Global Important Bird Areas are sites that meet at least one of the following criteria:

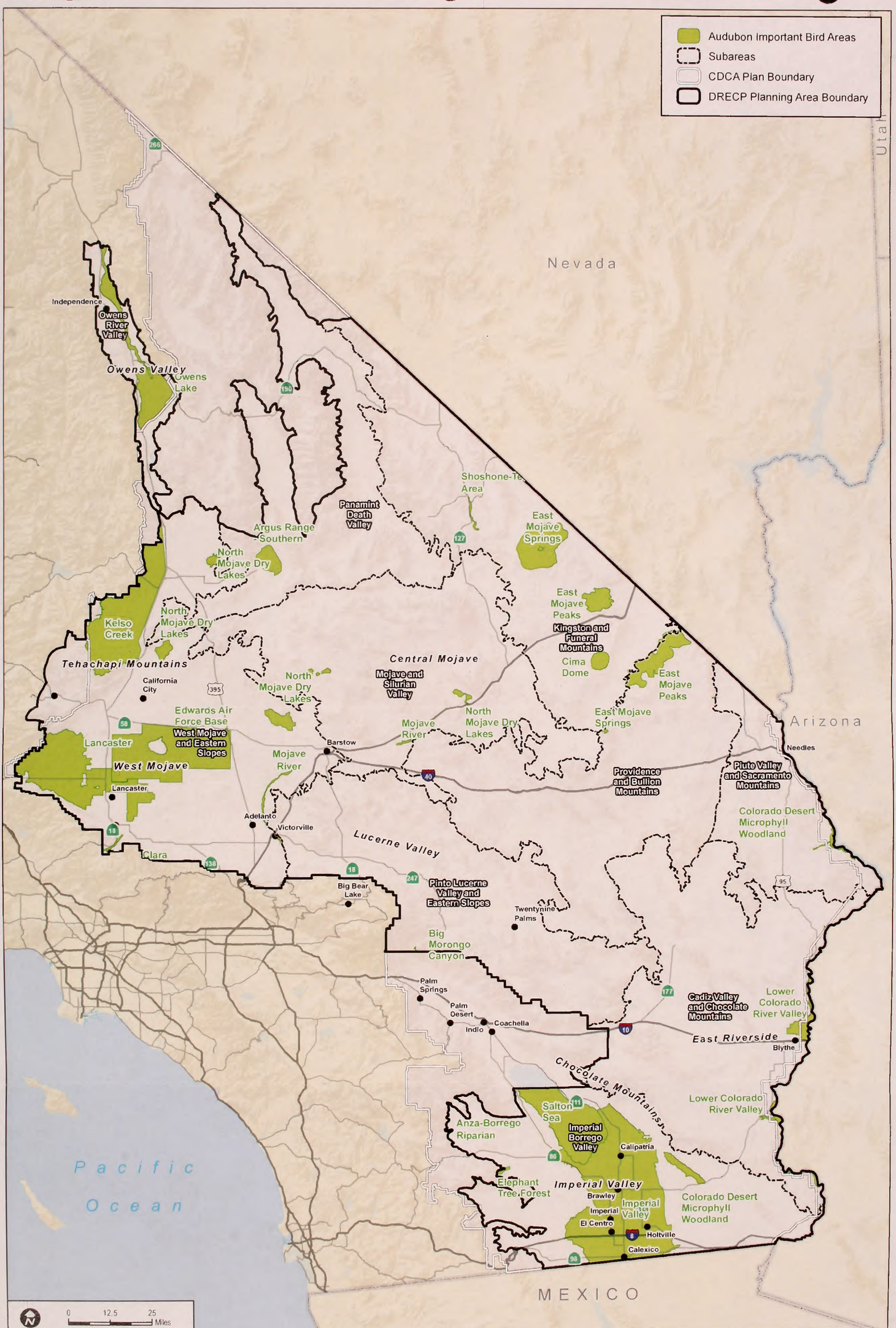
- Regularly holds significant numbers of a globally threatened species, or other species of global conservation concern.
- Holds a significant proportion of a species or assemblage of species (excluding seabirds) whose range is considered restricted (i.e., a world distribution of less than 50,000 km^2 (19,305 mi^2)).
- Holds a significant proportion of a species or assemblage of species (excluding seabirds) whose distributions are largely or wholly confined to one biome (world distribution often is more than 50,000 km^2 (19,305 mi^2)).
- Regularly supports at least 1% of the North American population of a congregatory waterbird species simultaneously, or 5% or more over a season.
- Regularly supports at least 1% of the global population of a congregatory seabird or landbird species simultaneously, or 5% or more over a season.

Represents a "bottleneck" where 5% or more of the North American population of a migratory waterbird species, or 5% or more of the global population of a migratory seabird or landbird species, regularly passes during the spring and/or autumn migration season. These Important Bird Areas provide a useful framework for helping guide efforts to conserve birds statewide (National Audubon Society 2008). There are 21 Important Bird Areas identified within the DRECP Plan Area, as shown in Figure III.7-15 and Table III.7-22.

Table III.7-22
Important Bird Areas within the DRECP Plan Area

Important Bird Area	Acreage	Audubon Conservation Status	Status	Criteria for Designation
Antelope Valley	280,000	Cons Action	Global	P/L
Anza-Borrego Riparian	40	NA	Global	P/L
Argus Range–Southern	<10	NA	State	P
Big Morongo Canyon	300	NA	State	P/L
Cima Dome	15,000	NA	State	P
Colorado Desert Microphyll Woodlands	21,000	High Priority	State	P
East Mojave Peaks	195,000	NA	Global	P
East Mojave Springs	2,000	NA	State	P
EAFB	296,000	NA	Global	L/S/W
Elephant Tree Forest	2,000	NA	State	P
Imperial Valley	624,000	Cons Action	Global	P/L/S/W
Kelso Creek	1,000	Cons Action	State	P/L
Lower Colorado River Valley	44,000	High Priority	Global	P/L/S/W
Mojave River	9,000	NA	State	P/L
North Mojave Dry Lakes	73,000	NA	State	L/W
Owens Lake	76,000	Cons Action	State	P/L/S/W
Owens River	38,000	Cons Action	State	P/L/W
Salton Sea	191,000	Cons Action	Global	P/L/S/W
Santa Clara River Valley	3,000	High Priority	Global	P/L
Shoshone-Tecopa Area	3,000	NA	State	L
Southern Sierra Desert Canyons	274,000	NA	State	L
Total	**2,149,000**			

NA = Not Assessed
Cons Action = Already receiving, or will receive, conservation work over the next 5 years
High Priority = A high priority for conservation based on analysis of biological value, threats, and conservation opportunities
P = >10% of CA/1% global population of one or more special-status taxa
L = 10 or more special-status species
S = >10,000 possible in 1-day count
W = >5,000 waterfowl in 1-day count
Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.



Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); National Audubon Society (2015)

FIGURE III.7-15

Audubon Important Bird Areas

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Cadiz Valley and Chocolate Mountains Ecoregion Subarea

The Important Bird Areas within the Cadiz Valley and Chocolate Mountains ecoregion subarea are shown on Figure III.7-15 and detailed in Table III.7-23.

Table III.7-23
Important Bird Areas within the Cadiz Valley and Chocolate Mountains Ecoregion Subarea of the DRECP

Important Bird Area	Acreage
Colorado Desert Microphyll Woodlands	2,000
Lower Colorado River Valley	34,000
Total	**36,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Imperial Borrego Valley Ecoregion Subarea

The Important Bird Areas within the Imperial Borrego Valley ecoregion subarea are shown on Figure III.7-15 and detailed in Table III.7-24.

Table III.7-24
Important Bird Areas within the Imperial Borrego Valley Ecoregion Subarea of the DRECP

Important Bird Area	Acreage
Anza-Borrego Riparian	40
Colorado Desert Microphyll Woodlands	18,000
Elephant Tree Forest	2,000
Imperial Valley	624,000
Lower Colorado River Valley	100
Salton Sea	191,000
Total	**835,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Kingston and Funeral Mountains Ecoregion Subarea

The Important Bird Areas within the Kingston and Funeral Mountains ecoregion subarea are shown on Figure III.7-15 and detailed in Table III.7-25.

Table III.7-25
Important Bird Areas within the Kingston and Funeral Mountains Ecoregion Subarea of the DRECP

Important Bird Area	Acreage
Cima Dome	15,000
East Mojave Peaks	129,000
East Mojave Springs	800
Shoshone–Tecopa Area	3,000
Total	**148,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10 and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Mojave and Silurian Valley Ecoregion Subarea

The Important Bird Areas within the Mojave and Silurian Valley ecoregion subarea are shown on Figure III.7-15 and detailed in Table III.7-26.

Table III.7-26
Important Bird Areas within the Mojave and Silurian Valley Ecoregion Subarea of the DRECP

Important Bird Area	Acreage
Mojave River	2,000
North Mojave Dry Lakes	10,000
Total	**11,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Owens River Valley Ecoregion Subarea

The Important Bird Areas within the Owens River Valley ecoregion subarea are shown on Figure III.7-15 and detailed in Table III.7-27.

Table III.7-27
Important Bird Areas within the Owens River Valley Ecoregion Subarea of the DRECP

Important Bird Area	Acreage
Owens Lake	76,000
Owens River	38,000
Total	**115,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Panamint Death Valley Ecoregion Subarea

The Important Bird Areas within the Panamint Death Valley ecoregion subarea are shown on Figure III.7-15 and detailed in Table III.7-28.

Table III.7-28
Important Bird Areas within the Panamint Death Valley Ecoregion Subarea of the DRECP

Important Bird Area	Acreage
Argus Range–Southern	<10
North Mojave Dry Lakes	27,000
Total	**27,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

The Important Bird Areas within the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea are shown on Figure III.7-15 and detailed in Table III.7-29.

Table III.7-29
Important Bird Areas within the Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea of the DRECP

Important Bird Area	Acreage
Big Morongo Canyon	300
Mojave River	200
Total	**400**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the

nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Piute Valley and Sacramento Mountains Ecoregion Subarea

The Important Bird Areas within the Piute Valley and Sacramento Mountains ecoregion subarea are shown on Figure III.7-15 and detailed in Table III.7-30.

Table III.7-30
Important Bird Areas within the Piute Valley and Sacramento Mountains Ecoregion Subarea of the DRECP

Important Bird Area	Acreage
Colorado Desert Microphyll Woodlands	1,000
East Mojave Springs	40
Lower Colorado River Valley	10,000
Total	**11,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Providence and Bullion Mountains Ecoregion Subarea

The Important Bird Areas within the Providence and Bullion Mountains ecoregion subarea are shown on Figure III.7-15 and detailed in Table III.7-31.

Table III.7-31
Important Bird Areas within the Providence and Bullion Mountains Ecoregion Subarea of the DRECP

Important Bird Area	Acreage
East Mojave Peaks	66,000
East Mojave Springs	900
Total	**67,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

West Mojave and Eastern Slopes Ecoregion Subarea

The Important Bird Areas within the West Mojave and Eastern Slopes ecoregion subarea are shown on Figure III.7-15 and detailed in Table III.7-32.

Table III.7-32
Important Bird Areas within the West Mojave and Eastern Slopes Ecoregion Subarea of the DRECP

Important Bird Area	Acreage
Antelope Valley	280,000
EAFB	296,000
Kelso Creek	1,000
Mojave River	7,000
North Mojave Dry Lakes	36,000
Santa Clara River Valley	3,000
Southern Sierra Desert Canyons	274,000
Total	**897,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

III.7.5.4 Fish

Because fish are limited to aquatic habitats, they are not common throughout the DRECP Plan Area. However, approximately 35 taxa are known from the Sonoran Desert and 19 taxa are known from the Mojave Desert (CDFG 2010a, as cited in Appendix Q). Several of these fish taxa are included on the CDFW Special Animals List or are listed under the ESA because of their high level of endemism or because of other threats and environmental stressors. Special-status fish in the Mojave Desert include Amargosa pupfish (*Cyprinodon nevadensis amargosae*), Saratoga Springs pupfish (*Cyprinodon nevadensis nevadensis*), Shoshone pupfish (*Cyprinodon nevadensis shoshone*), Owens pupfish (*Cyprinodon radiosus*), Owens tui chub (*Siphateles bicolor snyderi*), Cottonball Marsh pupfish (*Cyprinodon salinus milleri*), Salt Creek pupfish (*Cyprinodon salinus salinus*), Mohave tui chub (*Siphateles (Gila) bicolor mohavensis*), arroyo chub (*Gila orcutti*), Amargosa Canyon speckled dace (*Rhinichthys osculus* ssp. 1), and Owens speckled dace (*Rhinichthys osculus* ssp. 2). Special-status fish known from the Sonoran Desert include desert pupfish (*Cyprinodon macularius*), razorback sucker (*Xyrauchen texanus*), and bonytail chub (*Gila elegans*), the latter two of which are federally and state-listed endangered and occur in the Colorado River.

Non-native fish predators within the DRECP Plan Area are a serious threat to native fish populations. In addition to predating on young and adult fish, non-native fish predators compete with native fish for food and habitat. Non-native fish predators in the DRECP Plan Area include largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieui*), brown trout (*Salmo trutta*), and bluegill (*Lepomis macrochirus*), mosquitofish (*Gambusia affinis*), and crayfish (*Pastifasticus leniusculus*). In addition to non-native predators, other threats to native fish species within the DRECP Plan Area include habitat destruction and modifications including water diversions, decrease in water quality, increase in emergent vegetation, and hybridization with introduced fish species.

Amargosa pupfish (including all three subspecies *C. n. amargosae*, *C. n. nevadensis* and *C. n. shoshone*) inhabit freshwater marsh in the Amargosa River in Amargosa Canyon and marshes associated with Tecopa Hot Springs and Tecopa Borehole. These broad marshes support algae and emergent cattails and rushes (*Juncus* spp.). The Saratoga Springs pupfish only occurs in Saratoga Springs in the southeastern corner of Death Valley. The Shoshone pupfish occurs within an artificial pond within the Shoshone Spring system (Parmenter, pers. comm. 2013). Amargosa pupfish primarily feed on cyanobacteria and algae, but seasonally they prey on small invertebrates such as chironomid larvae, ostracods, copepods, and mosquito larvae (Moyle 2002, as cited in Appendix Q). They occur in areas where the water column velocities are less than 2 centimeters per second (0.79 inches/second) (Moyle 2002, as cited in Appendix Q). Seasonal water temperatures range from 10 degrees Celsius (°C) to 38°C (50°F and 100°F) and may be close to freezing during severe winters; the maximum water temperature these pupfish can stand is about 42°C (108°F) (Moyle 2002, as cited in Appendix Q).

In contrast to the freshwater pupfish, the Cottonball Marsh pupfish and Salt Creek pupfish are adapted to much more saline conditions that may be more than two times saltier than seawater at times. Both subspecies occur on the Death Valley floor—Salt Creek pupfish on Salt Creek in the northern part of Death Valley and Cottonball Marsh pupfish in a marsh adjacent to the sink for Salt Creek. Occupied pools are bordered by salt-tolerant plants, such as saltgrass (*Distichlis spicata*) and pickleweed (*Salicornia* spp.). The Salt Creek pupfish primarily feeds on algae and cyanobacteria, but the Cottonball Marsh pupfish, and likely the Salt Creek pupfish, also feed on amphipods, ostracods, and small snails that occur on algal mats. Seasonal water temperatures range from near freezing to almost 40°C (104°F). Salt Creek pupfish can tolerate water temperatures up to 38°C (100°F) and survive in short-term exposure to 43°C (109°F). Salt Creek pupfish exhibit opportunistic, explosive population increases when water flows are high, possibly reaching peaks in the millions and measuring densities of 527 fish per square meter. The population peaks, followed by die-offs when waters recede, provide abundant food source for birds such herons and egrets and common ravens (*Corvus corax*) (Moyle 2002, as cited in Appendix Q).

The desert pupfish occurs in small isolated populations around the Salton Sea, New and Alamo rivers (and associated tributaries), and in shoreline pools and irrigation drainages with quiet water conditions (Moyle 2002, as cited in Appendix Q). They have also been introduced into sanctuaries in Anza-Borrego Desert State Park and elsewhere. Desert pupfish are adapted to a wide range of habitat conditions, occurring in fresh water to highly saline conditions twice as salty as sea water and water temperatures ranging from 7°C to 45°C (45°F to 113°F) (Moyle 2002, as cited in Appendix Q). During the winter, they bury themselves under loose debris and become dormant (Moyle 2002, as cited in Appendix Q). They are opportunistic omnivores, feeding on algae, ostracods, copepods, aquatic crustaceans, insect larvae, and small snails.

III.7.5.5 Mammals

The DRECP Plan Area is within or intersects with the geographic ranges of about 75 mammal species (Ingles 1965, as cited in Appendix Q), including rodents, bats, shrews, carnivores, and ungulates.

III.7.5.5.1 Small Mammals

The largest group of mammals occurring in the DRECP Plan Area is rodents (Rodentia) comprising approximately 36 species. The rodent group present in the DRECP Plan Area includes about 12 species of kangaroo rats (*Dipodomys* spp.), kangaroo mice (*Microdipodops* ssp.), and pocket mice (*Perognathus* and *Chaetodipus* spp.); about 12 species of "old world rodents" (Muridae), including harvest mouse (*Reithrodontomys megalotis*), woodrats (*Neotoma* spp.), deer mice (*Peromyscus* spp.), voles (*Microtus* spp.), and muskrat (*Ondatra zibethica*); about 6 squirrel species (*Ammospermophilus* spp., *Xerospermophilus* spp., *and Spermophilus* spp.); 4 chipmunk species (Sciuridae); and 2 gopher species (*Thomomys* spp.).

At least one small mammal—desert kangaroo rat (*Dipodomys deserti*)—is closely associated with dune habitats throughout the Mojave and Colorado/Sonoran deserts. This species digs burrows at the base of perennial shrubs in more stabilized areas of dunes and not in areas of rapidly shifting sand (Hoffmeister 1986, as cited in Appendix Q).

Mammals occurring in grasslands can be categorized by their primary foraging habits as herbivores, granivores, omnivores, or carnivores. In addition, most mammal species using desert grasslands require other habitats for important aspects of their daily activities or their life history. For example, many of the mammals found in grasslands use shrubs, rocks, and other substrates for cover, refuge, or nesting and burrowing. For this reason, many of the mammals using desert grasslands occur in grassland/shrubland mosaics and shrub steppe vegetation types more frequently than monotypic grasslands. Common desert grassland herbivores (grazers and browsers) include desert cottontail (*Sylvilagus*

audubonii), black-tailed jackrabbit (*Lepus californicus*), white-tailed antelope squirrel (*Ammospermophilus leucurus*), round-tailed ground squirrel (*Xerospermophilus tereticaudus*), the endemic Mohave ground squirrel (*Xerospermophilus mohavensis*), and Botta's pocket gopher (*Thomomys bottae*). These species primarily forage on grasses and forbs but may also feed on leaves or seeds.

Several mammals are strongly associated with unvegetated habitats. Spiny pocket mouse (*Chaetodipus spinatus*) occurs in the Sonoran Desert, and the canyon mouse (*Peromyscus crinitus*) occurs throughout the DRECP Plan Area in rocky habitats. The canyon mouse burrows beneath rocks and in rock crevices. The rock squirrel (*Spermophilus variegatus*) is endemic to the Providence Mountains in the eastern Mojave Desert where it uses rocky areas for burrows and dens.

Mammals that are common, but generally limited to desert scrub in the DRECP Plan Area, are almost all rodents. Most of the rodent species are kangaroo rats or pocket mice and several occur throughout the Mojave and Colorado/Sonoran deserts, including Merriam's kangaroo rat, desert kangaroo rat, little pocket mouse (*Perognathus longimembris*), and long-tailed pocket mouse (*Chaetodipus formosus*). Other kangaroo rats and pocket mice are less widespread and more locally distributed, including Great Basin pocket mouse (*Perognathus parvus*), desert pocket mouse (Sonoran Desert and locally in Mojave Desert), spiny pocket mouse (primarily Sonoran Desert), chisel-toothed kangaroo rat (*Dipodomys microps*) (Mojave and Great Basin desert areas supporting shadscale), and Panamint kangaroo rat (*Dipodomys panamintinus*) (Mojave and Great Basin deserts). Other common rodents in the desert scrub vegetation types include cactus mouse (*Peromyscus eremicus*), canyon deermouse (*Peromyscus crinitus*), grasshopper mouse (*Onychomys torridus*), and desert woodrat (*Neotoma lepida*). The white-throated woodrat (*Neotoma albigula*) occurs throughout the Colorado/Sonoran Desert. While the white-tailed antelope squirrel is fairly widespread throughout the DRECP Plan Area, the ground squirrels tend to have limited distributions. The round-tailed ground squirrel is also fairly widespread in the Colorado/Sonoran Desert and eastern Mojave Desert. The Mohave ground squirrel is limited to the western Mojave Desert in the eastern Kern, northeastern Los Angeles, western San Bernardino, and southwestern Inyo counties. The rock squirrel is limited to the Providence Mountains in the eastern Mojave Desert. Two lagomorphs are common throughout the scrub vegetation types—black-tailed jackrabbit and desert cottontail.

Certain small mammals are also fairly exclusive to coastal scrub and chaparral habitats, including dusky-footed woodrat (*Neotoma fuscipes*), Pacific kangaroo rat (*Dipodomys agilis*), Dulzura kangaroo rat (*Dipodomys simulans*), brush deermouse (*Peromyscus boylii*), California deermouse (*Peromyscus californicus*), California pocket mouse (*Chaetodipus californicus*), San Diego pocket mouse (*Chaetodipus fallax*), and brush rabbit (*Sylvilagus bachmani*).

At least three mammals may occur in marsh habitat associated with the Colorado River system—Arizona and Yuma hispid cotton rat (*Sigmodon arizonae plenus* and *S. hispid eremicus*), muskrat (Zeiner et al. 1990, as cited in Appendix Q), and American beaver (*Castor canadensis*). The muskrat is not native to California but may occur in marshy habitat elsewhere in the DRECP Plan Area such as the Salton Sea, irrigation canals and drains in the Imperial Valley, and at least two locations in southern Inyo County (Zeiner et al. 1990, as cited in Appendix Q). The muskrat is primarily herbivorous and feeds on aquatic plants such as cattails and bulrush (*Scirpus* spp.), but it also preys on small vertebrates such as crayfish, which also are not native to California (Zeiner et al. 1990, as cited in Appendix Q). Within the DRECP Plan Area, Amargosa vole is also closely associated with marsh systems and is a Focus Species under DRECP. Although not a Focus Species, Owens Valley vole (*Microtus californicus vallicola*) is associated with marsh habitats in the DRECP Plan Area.

Riparian vegetation along perennial water sources provide habitat for the American beaver. Within the DRECP Plan Area, American beavers are known to occur along the Colorado River (Zeiner et al. 1990, as cited in Appendix Q), in the Imperial Valley agricultural complex, and on the San Bernardino National Forest.

Small mammals such as chipmunks are strongly associated with coniferous habitats. Several other small mammals that occur in the coniferous habitats are also common in the woodland and savannah and scrub and chaparral habitats, including deer mice and woodrats.

The San Diego pocket mouse occurs in pinyon–juniper, as well as scrubs and chaparral in the Peninsular Ranges. Other relatively common mammals occurring in pinyon–juniper woodland, as well as other vegetation types, are black-tailed jackrabbit, brush rabbit, desert cottontail, Pacific kangaroo rat, California pocket mouse, dusky-footed woodrat, desert woodrat, and several deermouse species.

III.7.5.5.2 Carnivores and Ungulates

Eleven carnivore (Carnivora) species occur in the DRECP Plan Area, including mountain lion (*Puma concolor*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus californicus*), desert kit fox (*Vulpes macrotis arsipus*), American black bear (*Ursus americanus*), raccoon (*Procyon lotor*), ringtail (*Bassariscus astutus*), weasel (*Mustela* spp.), and American badger (*Taxidea taxus*). At least three ungulates occur in the DRECP Plan Area, including elk (*Cervus elaphus*), bighorn sheep, and mule deer (*Odocoileus hemionus*).

Mammals such as mule deer, gray fox, bobcat, and raccoon use woodland and forests for cover, refuge, and movement. Jeffrey pine (*Pinus jeffreyi*) provides seed for many species, as well as bark and foliage that are food sources for squirrels and mule deer. Large mammals found in pinyon–juniper include mule deer, mountain lion, and bobcat. Several mammalian

carnivores, including coyote, desert kit fox, gray fox, and American badger, hunt in desert grasslands for lagomorphs, rodents, birds, reptiles, amphibians, and larger invertebrates. Three subspecies of mule deer occur in the DRECP Plan Area, including California mule deer (*Odocoileus hemionus californicus*), the most abundant and widespread of California's mule deer sub-species, desert mule deer or burro deer (*O. h. eremicus*), and Inyo mule deer (*O. h. inyoensis*) (CDFG 2012c).

Desert scrub vegetation types generally host few large mammals (Appendix Q), with kit fox and coyote being the most common inhabitants. However, gray fox, ringtail, bobcat, and American badger occur frequently in the desert scrub. Bighorn sheep occur in scattered locations in steep and rugged rocky terrains associated with the many mountain ranges in the DRECP Plan Area. Bighorn sheep use rocky terrains for escape, bedding, and lambing, but they move to more open and exposed habitats to forage and access water.

III.7.5.5.3 Bats

Bats (Chiroptera) form the second largest group of mammals within the DRECP Plan Area, with approximately 19 species, including species from the Phyllostomatidae (leaf-nosed bats), Verspertionidae (evening bats), and Molossidae (free-tailed bats) families.

Several bat species use rock outcrops and crevices for day roosting sites. The bat species most strongly associated with rocky crevices include Yuma myotis (*Myotis yumanensis*), California myotis (*M. californicus*), long-legged myotis (*M. volans*), western pipistrelle (*Pipistrellus hesperus*), spotted bat (*Euderma maculatum*), and pocketed free-tailed bat (*Nyctinomops femorosaccus*), which must drop from a height to gain flying speed. Other bat species that use rock crevices include fringed myotis (*M. thysanodes*), western small-footed myotis (*Myotis ciliolabrum*), pallid bat (*Antrozous pallidus*), and Brazilian free-tailed bat (*Tadarida brasiliensis*). California leaf-nosed bat (*Macrotus californicus*), pallid bat, and Townsend's big-eared bat (*Corynorhinus townsendii*) use caves, mines, and tunnels and are often associated with unvegetated areas. Bat use of roost sites in the DRECP Plan Area is not well understood for most species, but several bat species have been recorded in various areas of the DRECP Plan Area. Californian myotis has been documented in southern Inyo County, eastern Kern County, and south-central San Bernardino County. The pallid bat and Townsend's big-eared bat have been documented in scattered locations throughout the DRECP Plan Area. California leaf-nosed bat appears to have expanded its range northward and has been documented in caves and mines in much of the DRECP Plan Area. Several other species have been documented in single areas: big brown bat (*Eptesicus focus*) in northern Riverside County, Yuma myotis in eastern Los Angeles County, and long-legged myotis in southern Inyo County.

There are few records for western red bat (*Lasiurus blossevillii*), a tree bat closely associated with well-developed riparian habitats that provide suitable roosting sites. There are two

records for Death Valley and a breeding record for the Twentynine Palms area (Pierson et al. 2006). The hoary bat (*L. cinereus*) has been recorded along the Lower Colorado River, in the Little San Bernardino Mountains, the Clark and Granite Mountains in eastern San Bernardino County, Death Valley in Inyo County, and the Chocolate Mountains in Imperial County.

Several bat species have geographic ranges that overlap the three main agricultural areas within the DRECP Plan Area. While most bats primarily forage in natural habitats (e.g., scrubs, chaparral, woodland, forest, desert wash, and riparian areas), they also may be attracted to agricultural fields for insect prey, including moths, dragonflies, damselflies, grasshoppers, crickets, mantids, walking sticks, true bugs, beetles, ants, wasps, and bees. Bat species that may occur throughout the DRECP Plan Area and that may forage in agricultural areas include big brown bat, Brazilian free-tailed bat, California myotis, pallid bat, spotted bat, Townsend's big-eared bat, and western pipistrelle. Bats that may occur more locally in the DRECP Plan Area and forage in agricultural areas include California leaf-nosed bat in the Sonoran and eastern Mojave deserts, pocketed free-tailed bat and western yellow bat (*Lasiurus xanthinus*) in the Sonoran Desert, and Yuma myotis along the Colorado River.

III.7.6 Special-Status Species

Special-status species herein are defined as plants and animals legally protected under the ESA and/or the CESA, or otherwise designated as special-status or sensitive under state and/or federal regulations and policies. State and federal definitions for these species are provided in Section III.7.1.

Special-status plants are species that fall into one or more of the following categories:

- Listed or proposed for listing as threatened or endangered under the ESA (50 CFR 17.12)
- Candidates for possible future listing as threatened or endangered under the ESA (75 FR 69222–69294)
- Listed or candidates for listing by the State of California as threatened or endangered under the CESA (14 CCR 670.5)
- Listed as rare under the California Native Plant Protection Act (California Fish and Game Code, Section 1900 et seq.)
- Determined to meet the definitions of rare or endangered under the California Environmental Quality Act (CEQA) (14 CCR 15380)
- Considered by the California Native Plant Society (CNPS) to be "rare, threatened, or endangered in California" (California Rare Plant Rank [CRPR] 1B

and 2 in CNPS [2011]) or vascular plants, bryophytes, and lichens listed as having special status (CDFW 2013c)

- Listed by CNPS as plants about which more information is needed to determine their status and plants of limited distribution (CRPR 3 and 4 in CNPS [2011]) that may be included on the basis of local significance or recent biological information
- Designated by BLM or USFS as special status (often for the reasons listed above)

Special-status animals are species that fall into one or more of the following categories:

- Listed or proposed for listing as threatened or endangered under the ESA (50 CFR 17.11)
- Candidates for possible future listing as threatened or endangered under the ESA (75 FR 69222–69294)
- Determined to meet the definitions of rare or endangered under CEQA (14 CCR 15380)
- Listed or candidates for listing by the State of California as threatened or endangered under the CESA (14 CCR 670.5)
- State wildlife Species of Special Concern (CDFG 2011)
- Fully protected species under the California Fish and Game Code Section 3511 (birds), Section 4700 (mammals), Section 5515 (fish), and Section 5050 (reptiles and amphibians)
- Designated by BLM or USFS as special status (often for the reasons listed above)

III.7.6.1 Focus and Planning Species

Focus Species are those species, subspecies, or varieties whose conservation and management are provided for in the DRECP BLM LUPA. Species used in the development of the Draft DRECP conservation strategy, in addition to the identified Focus Species, are referred to as Planning Species. The Planning Agreement included an initial list of Species of Planning Interest, which was developed by the Renewable Energy Action Team (REAT) agencies during the early planning stages of the DRECP. In 2010 and 2012, the DRECP Independent Science Advisors and an Independent Science Panel provided recommendations for the Focus Species list. The process for developing the draft Focus Species (previously "Covered Species") List is summarized in Volume I, Chapter I.3, Section I.3.2 and additional information is provided in Appendix B of the Draft DRECP and EIR/EIS.

Table III.7-33 identifies the DRECP Focus and Planning Species list. Focus and Planning Species were selected through a review of their listing status, distribution in the DRECP Plan Area, presence of suitable habitat, and potential to be impacted by activities. Detailed species profiles containing legal status, natural history, and population status and trends,

as well as maps showing distribution of the species within the DRECP Plan Area, are found in the Baseline Biology Report (Appendix Q).

Thirty-seven taxa are considered Focus Species for the DRECP and two are considered Planning Species. They are listed in Table III.7-33 and shown on Figures III.7-16 through III.7-25. Figures III.7-16 through III.7-25 show a representation of where species have been recorded based on the DRECP species occurrence database, which is a compilation of multiple data sources; however, these figures do not offer a comprehensive inventory of all possible or actual species occurrences. Following Table III.7-33, a brief description of each Focus Species is provided.

Table III.7-33
DRECP Focus and Planning Species

Taxa	Common Name	Scientific Name	Federal Status[1]	State Status[2]
Focus Species				
Amphibian/ reptile	Agassiz's desert tortoise	*Gopherus agassizii*	FT	ST
	Flat-tailed horned lizard	*Phrynosoma mcallii*	BLM/FS	SC/CSC
	Mojave fringe-toed lizard	*Uma scoparia*	BLM	CSC
	Tehachapi slender salamander	*Batrachoseps stebbinsi*	BLM/FS	ST
Bird	Bendire's thrasher	*Toxostoma bendirei*	BCC/BLM	CSC
	Burrowing owl	*Athene cunicularia*	BCC/BLM	CSC
	California black rail	*Laterallus jamaicensis coturniculus*	BCC/BLM	ST/FP
	California condor	*Gymnogyps californianus*	FE	SE/FP
	Gila woodpecker	*Melanerpes uropygialis*	BCC/BLM	SE
	Golden eagle	*Aquila chrysaetos*	BCC/BLM	FP
	Greater sandhill crane	*Grus canadensis tabida*	BLM/FS	ST/FP
	Least Bell's vireo	*Vireo bellii pusillus*	FE/BCC	SE
	Mountain plover	*Charadrius montanus*	BCC/BLM	CSC
	Swainson's hawk	*Buteo swainsoni*	BLM/FS	ST
	Tricolored blackbird	*Agelaius tricolor*	BCC/BLM	SE
	Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	FT/FS/BCC/ BLM	SE
	Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus*)	Southwestern: FE	SE
	Yuma Ridgway's rail (formerly Yuma clapper rail)	*Rallus obsoletus yumanensis* (*R. longirostris yumanensis*)	FE/BCC	ST/FP

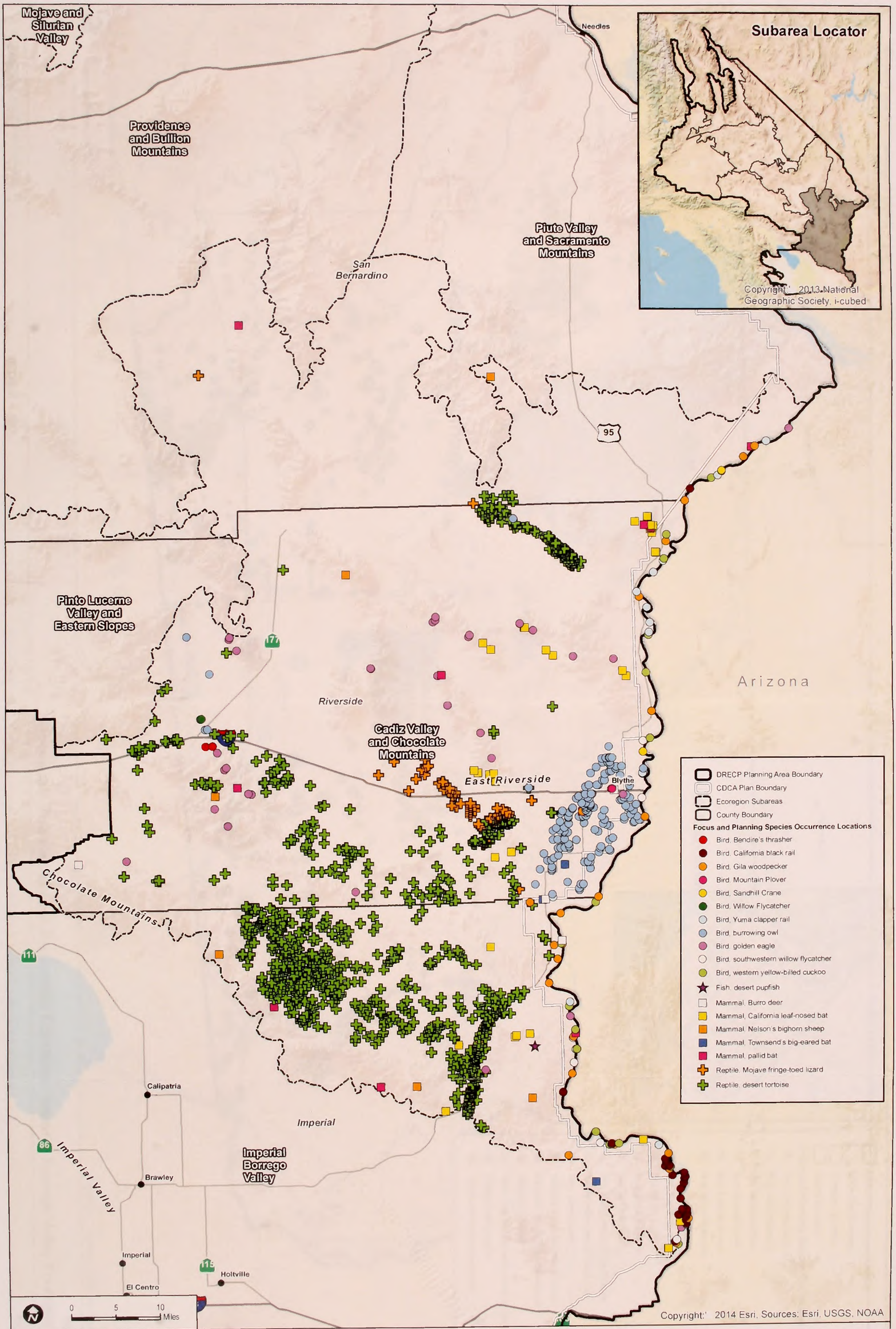
Table III.7-33
DRECP Focus and Planning Species

Taxa	Common Name	Scientific Name	Federal Status[1]	State Status[2]
Fish	Desert pupfish	*Cyprinodon macularius*	FE	SE
	Mohave tui chub	*Siphateles (Gila) bicolor mohavensis*	FE	SE/FP
	Owens pupfish	*Cyprinodon radiosus*	FE	SE/FP
	Owens tui chub	*Siphateles (Gila) bicolor snyderi*	FE	SE
Mammal	Desert bighorn sheep	*Ovis canadensis nelsoni*	BLM	FP[3]
	California leaf-nosed bat	*Macrotus californicus*	BLM/FS	CSC
	Mohave ground squirrel	*Xerospermophilus mohavensis*	BLM	ST
	Pallid bat	*Antrozous pallidus*	BLM/FS	CSC
	Townsend's big-eared bat	*Corynorhinus townsendii*	BLM/FS	SC/CSC
Plant	Alkali mariposa-lily	*Calochortus striatus*	BLM	(CRPR 1B.2)
	Bakersfield cactus	*Opuntia basilaris* var. *treleasei*	FE	SE (CRPR 1B.1)
	Barstow woolly sunflower	*Eriophyllum mohavense*	BLM	(CRPR 1B.2)
	Desert cymopterus	*Cymopterus deserticola*	BLM	(CRPR 1B.2)
	Little San Bernardino Mountains linanthus	*Linanthus maculatus*	BLM	(CRPR 1B.2)
	Mojave monkeyflower	*Mimulus mohavensis*	BLM	(CRPR 1B.2)
	Mojave tarplant	*Deinandra mohavensis*	BLM	SE (CRPR 1B.3)
	Owens Valley checkerbloom	*Sidalcea covillei*	BLM	SE (CRPR 1B.1)
	Parish's daisy	*Erigeron parishii*	FT	(CRPR 1B.1)
	Triple-ribbed milk-vetch	*Astragalus tricarinatus*	FE	(CRPR 1B.2)
Planning Species				
Mammal	Burro deer	*Odocoileus hemionus eremicus*	—	—
	Desert kit fox	*Vulpes macrotis arsipus*	—	—

1 Federal Status – FE: Federally Endangered; FT: Federally Threatened; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern.

2 State Status – SE: California Endangered; ST: California Threatened; SC: Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected. CRPR: California Rare Plant Rank (formerly known as the CNPS List)–CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere.

3 Limited hunting allowed.

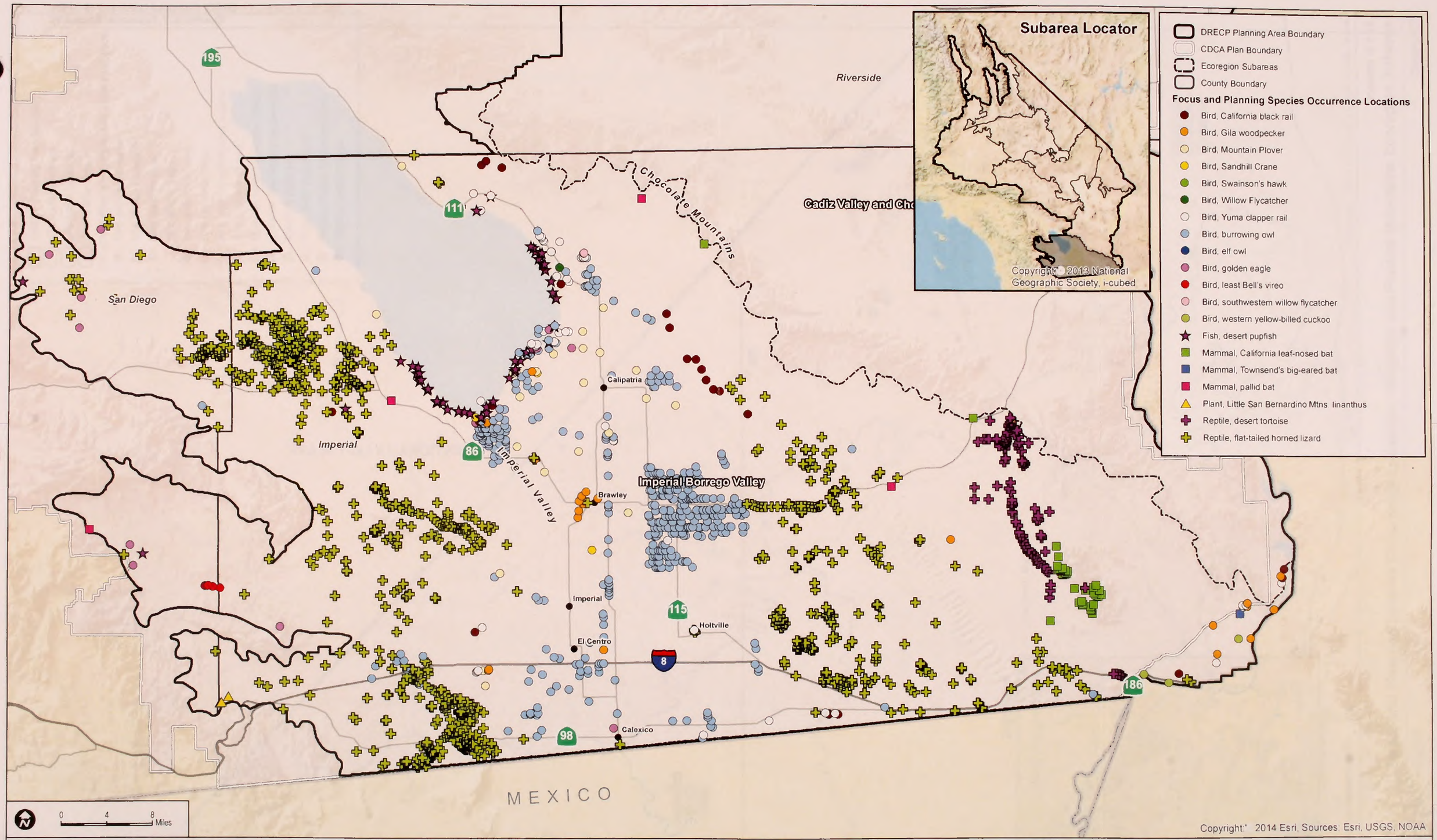


Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); CNDDB (2013)

FIGURE III.7-16

Focus and Planning Species Occurrence Locations - Cadiz Valley and Chocolate Mountains Ecoregion Subarea

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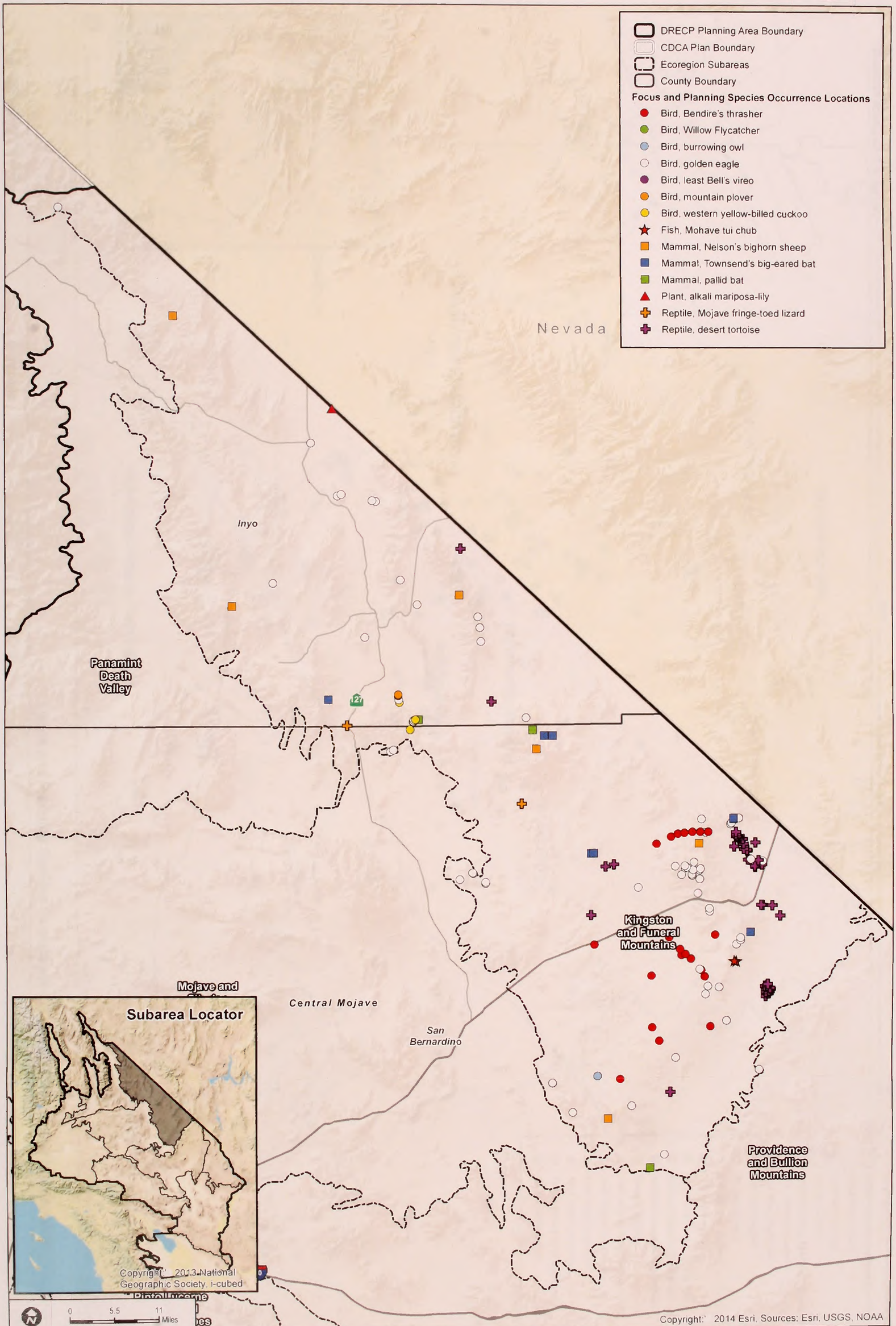


Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); CNDDB (2013)

FIGURE III.7-17

Focus and Planning Species Occurrence Locations - Imperial Borrego Valley Ecoregion Subarea

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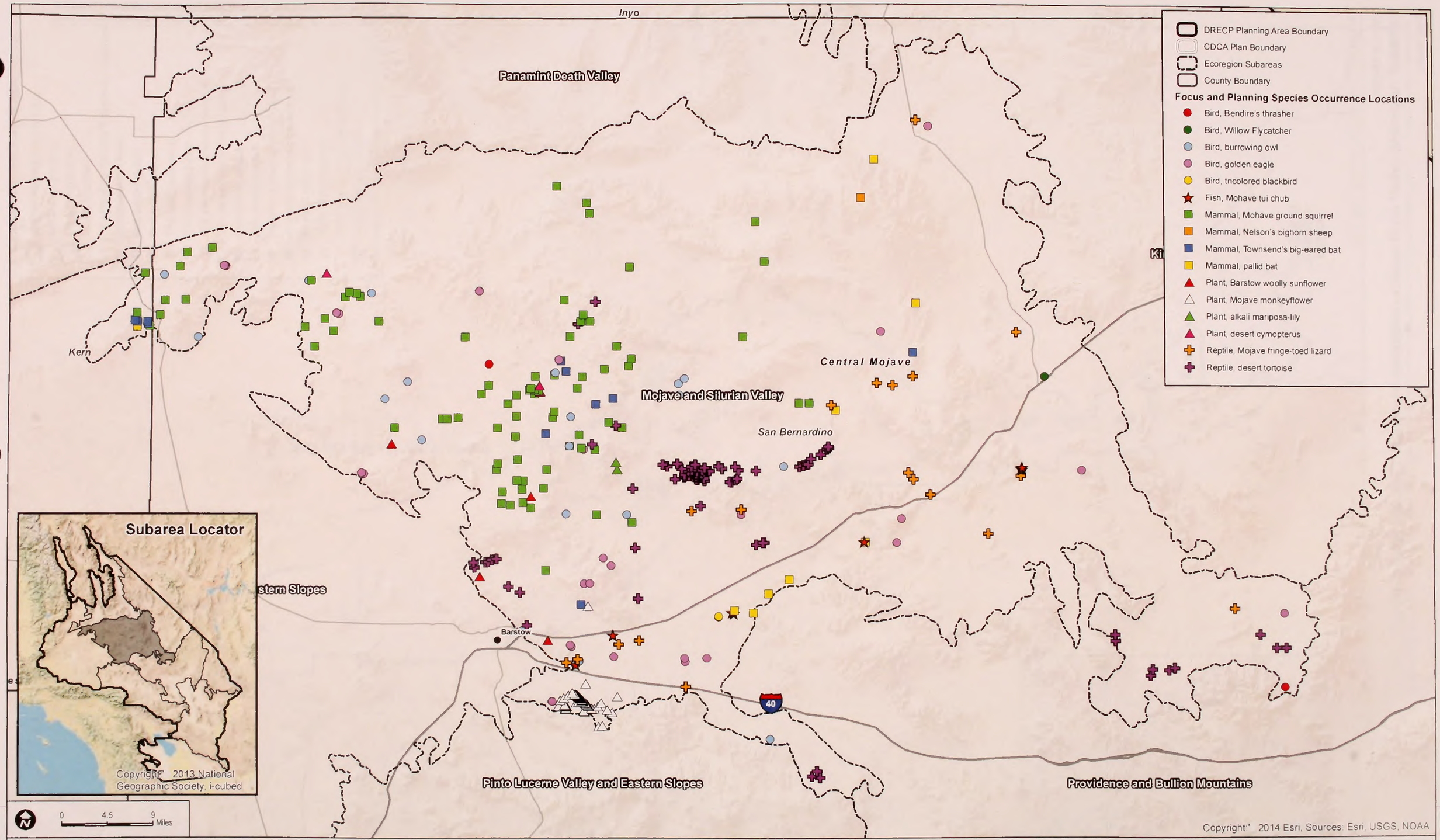


Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); CNDDB (2013)

FIGURE III.7-18

Focus and Planning Species Occurrence Locations - Kingston and Funeral Mountains Ecoregion Subarea

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Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); CNDDB (2013)

FIGURE III.7-19

Focus and Planning Species Occurrence Locations - Mojave and Silurian Valley Ecoregion Subarea

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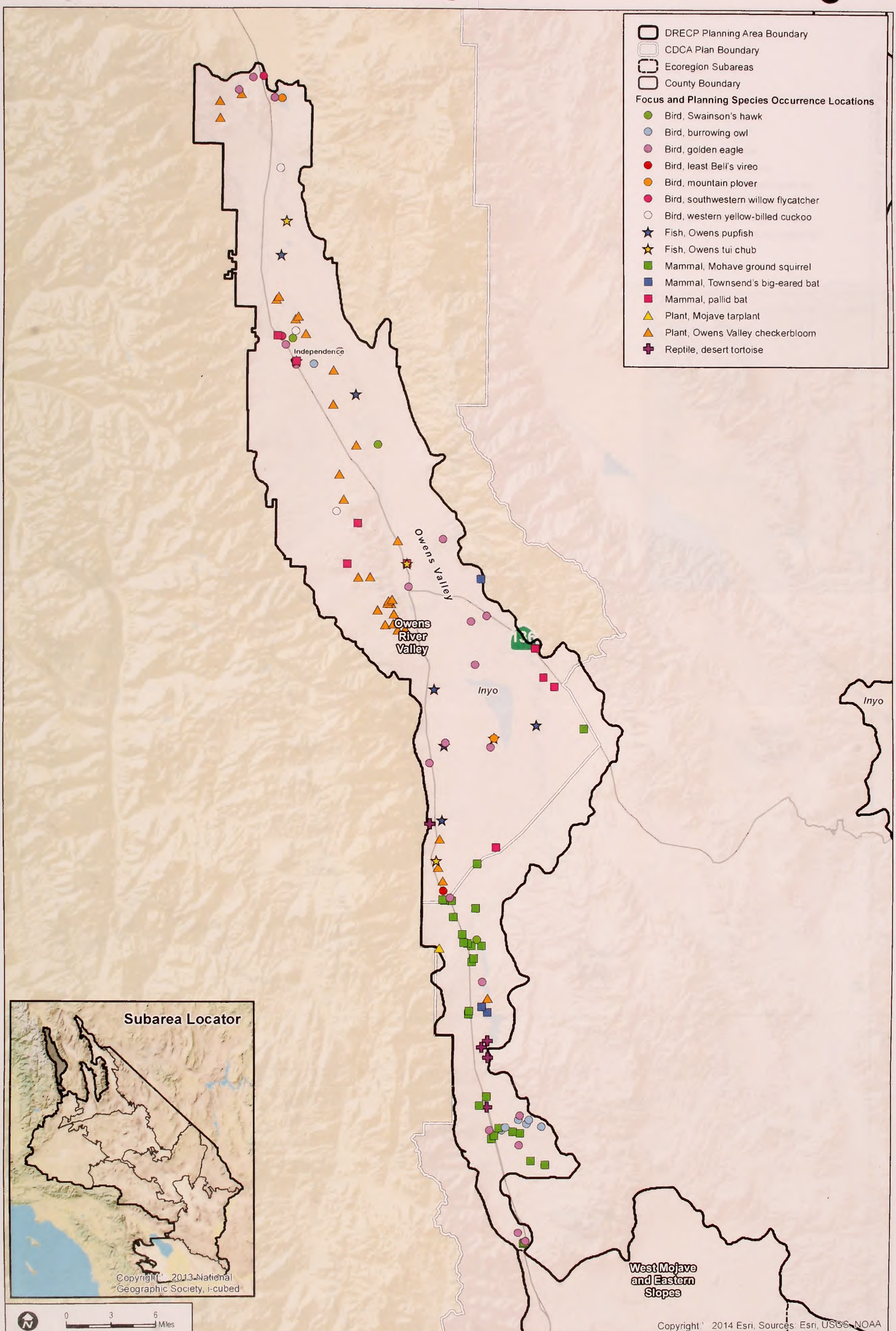
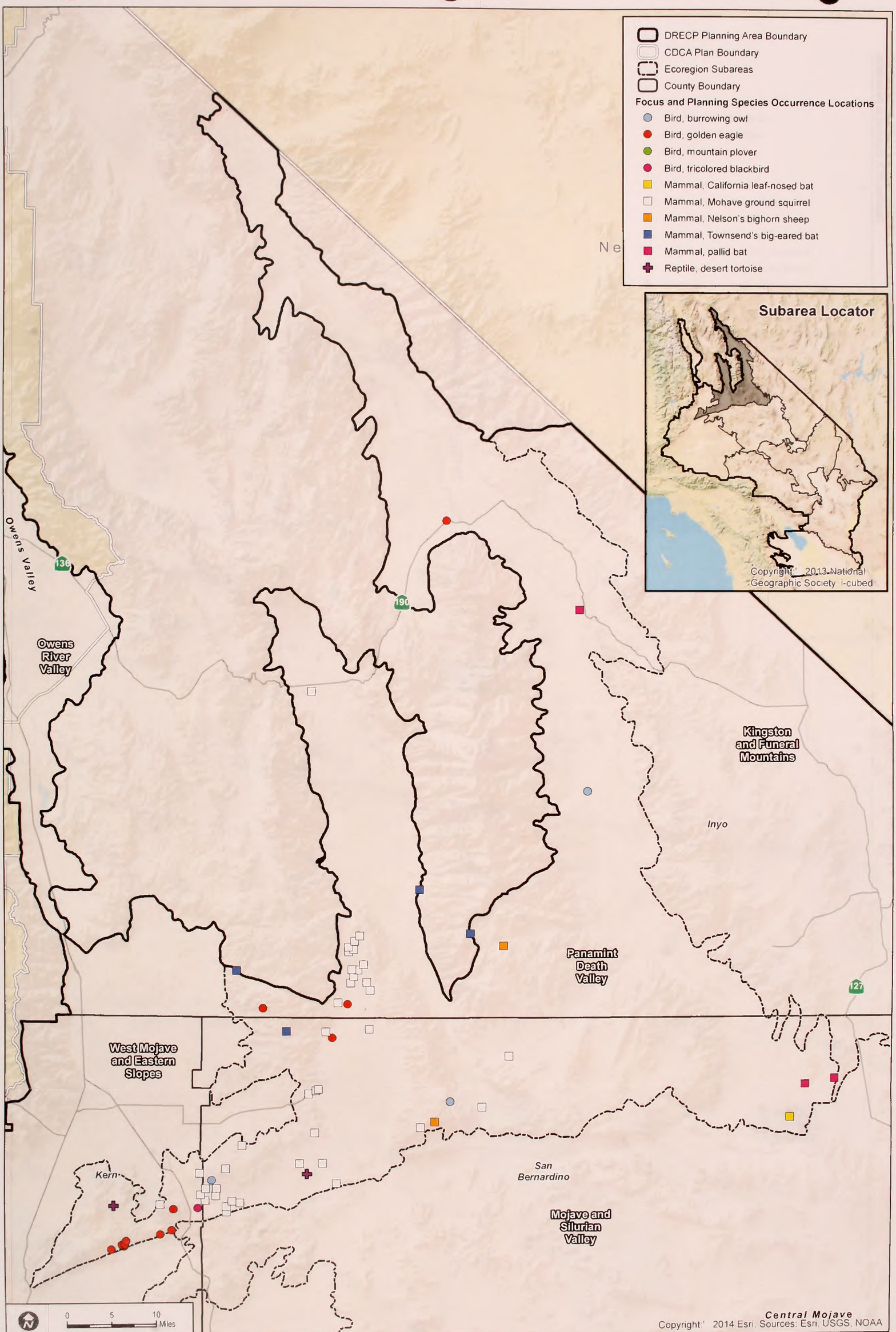


FIGURE III.7-20

Focus and Planning Species Occurrence Locations - Owens River Valley Ecoregion Subarea

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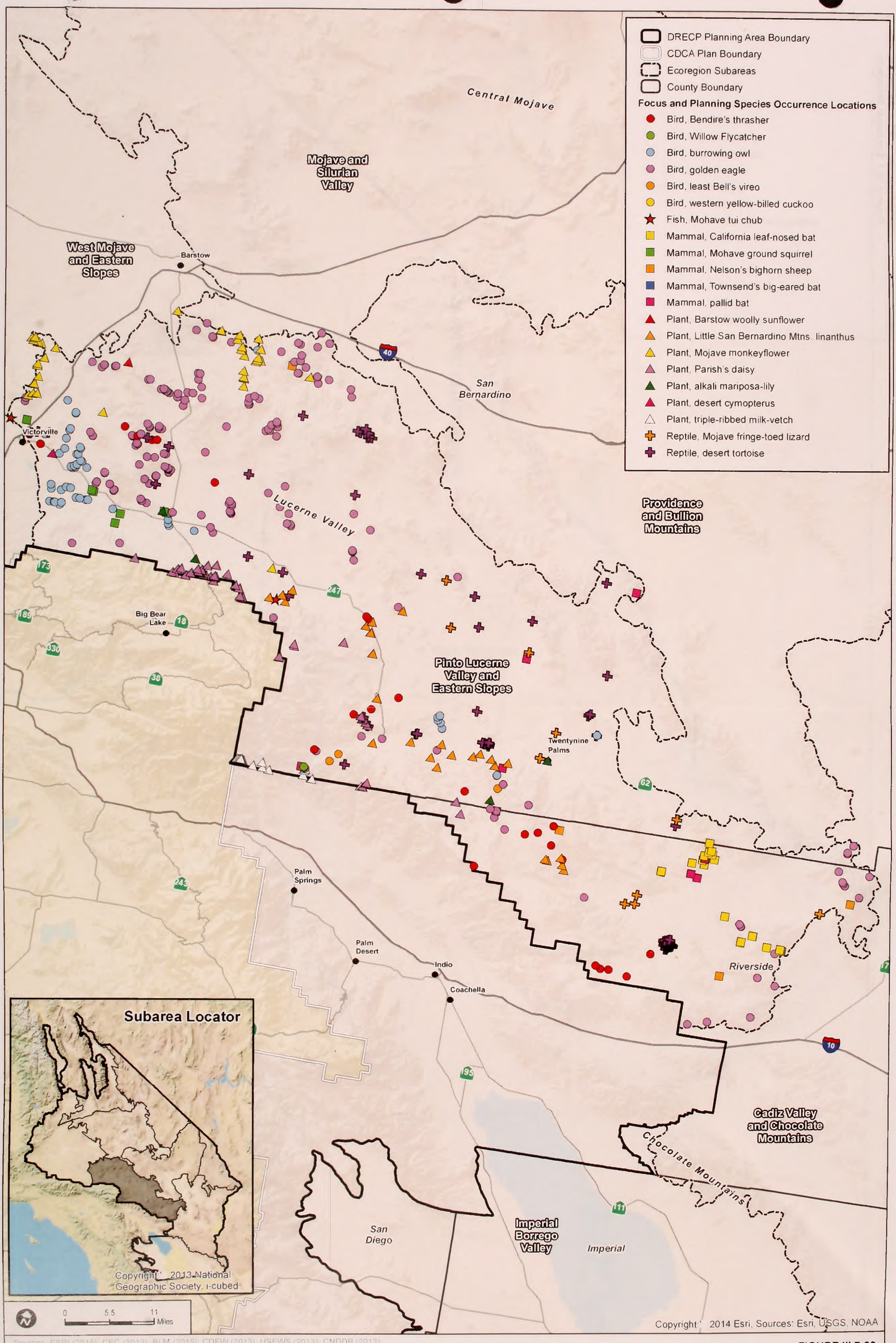


Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); CNDDB (2013)

FIGURE III.7-21

Focus and Planning Species Occurrence Locations - Panamint Death Valley Ecoregion Subarea

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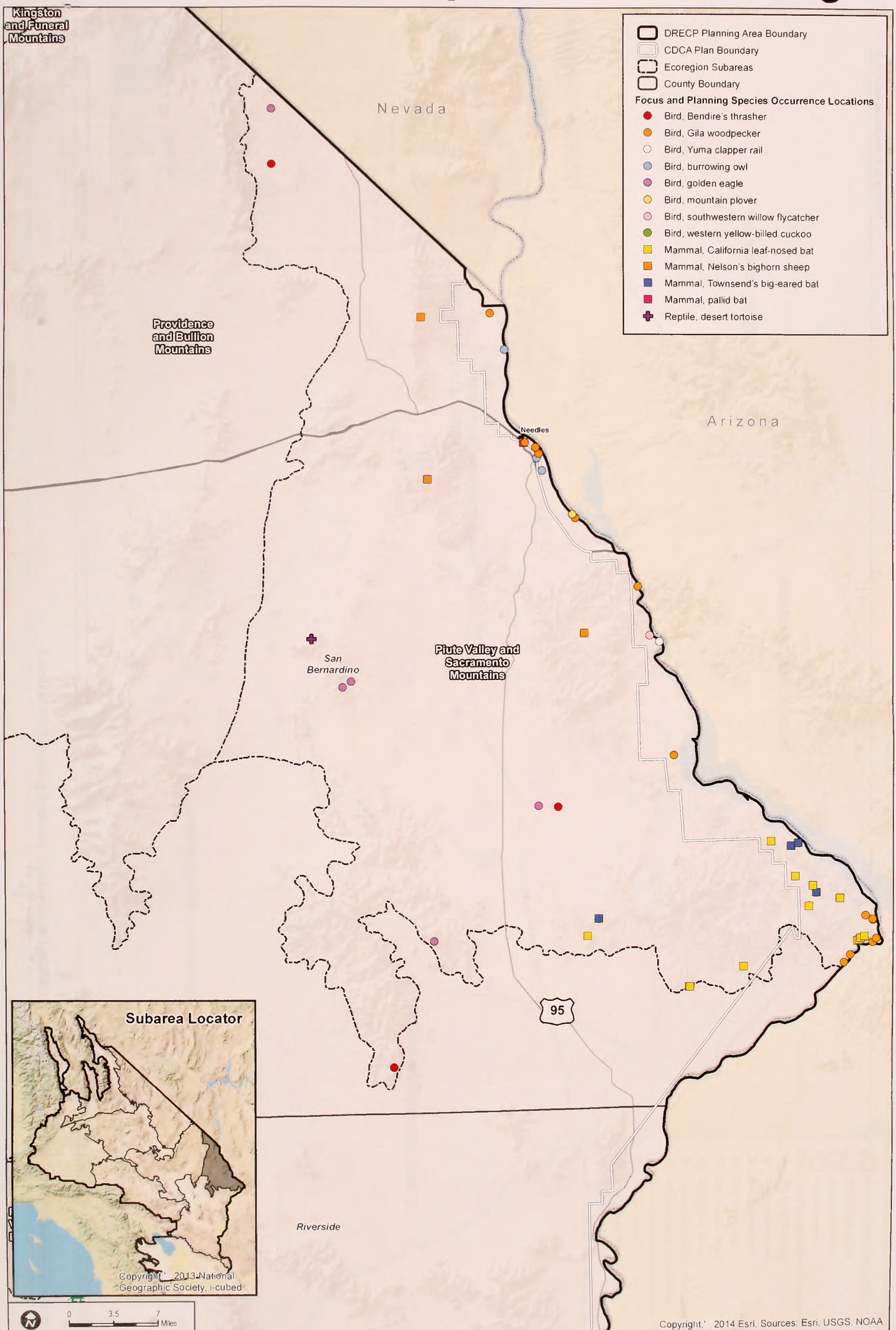


Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); CNDDB (2013)

FIGURE III.7-22

Focus and Planning Species Occurrence Locations - Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

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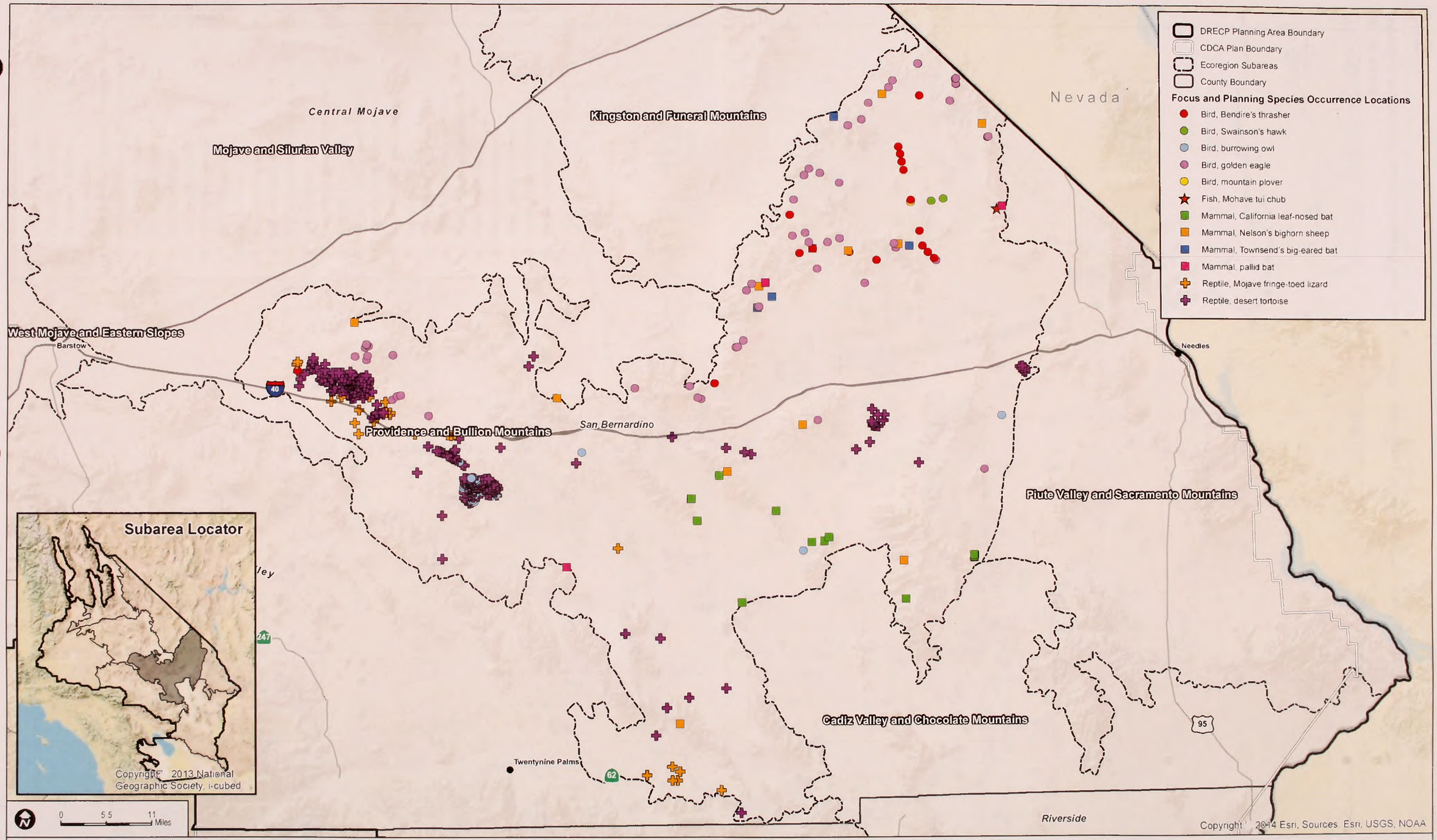


Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); CNDDB (2013)

FIGURE III.7-23

Focus and Planning Species Occurrence Locations - Piute Valley and Sacramento Mountains Ecoregion Subarea

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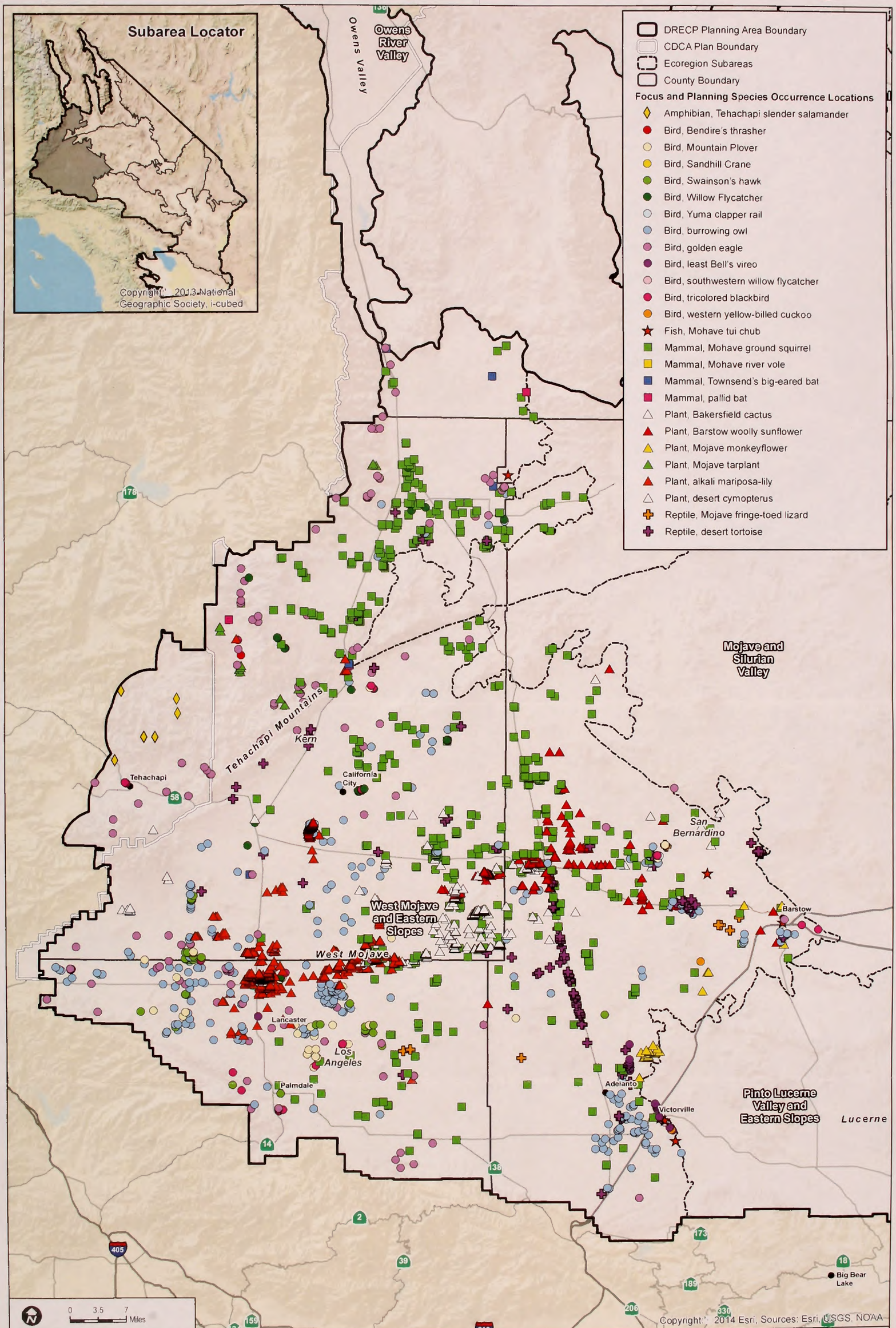


Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); CNDDB (2013)

FIGURE III.7-24

Focus and Planning Species Occurrence Locations - Providence and Bullion Mountains Ecoregion Subarea

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Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); CNDDB (2013)

FIGURE III.7-25

Focus and Planning Species Occurrence Locations - West Mojave and Eastern Slopes Ecoregion Subarea

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III.7.6.1.1 Amphibians/Reptiles

Agassiz's Desert Tortoise

Agassiz's desert tortoise (*Gopherus agassizii*) is both a federally and state-listed threatened species. Desert tortoises generally occur in alluvial fans, washes, canyons, and saltbush plains, and is associated with creosote bush scrub on alluvial fans and saltbush scrub. The desert tortoise is found throughout the DRECP Plan Area, but is mostly absent from the valley floor of the very hot, dry Coachella Valley, the Imperial County west of the Coachella Canal, and the Transverse Ranges along the periphery of the DRECP Plan Area.

The *Revised Recovery Plan for the Mojave Population of the Desert Tortoise* (USFWS 2011a) identifies six Recovery Units intended to facilitate an ecosystem approach to land management and desert tortoise recovery (USFWS 2011a). Three of the six recovery units are within the DRECP Plan Area (Table III.7-34). Tortoise Conservation Areas (TCAs) include desert tortoise habitat within critical habitat, Desert Wildlife Management Areas, Areas of Critical Environmental Concern, Grand Canyon–Parashant National Monument, Desert National Wildlife Refuge, National Park Service lands, Red Cliffs Desert Reserve, and other conservation areas or easements managed for desert tortoises (USFWS 2011a). Linkage habitat are important areas identified by Recovery Implementation Teams, such as important genetic linkages identified by Hagerty et al. 2010 (cited in USFWS 2011a) that are important to maintaining the species' distribution throughout its range. High priority habitat is high priority for management.

In addition, Averill-Murray et al. (2013) modeled linkages between TCAs using least-cost corridors based on an underlying model of suitable tortoise habitat. According to the models, suitable habitat within linkages connecting the TCAs in the base model totals 17,831 square kilometers (6.56 square miles). Habitat linkages identified with least-cost corridor models include linkages between Ord-Rodman and Joshua Tree National Park, Fremont-Kramer, Superior Cronese, and Mojave National Preserve; between Ivanpah and Superior-Cronese, Chemehuevi, Death Valley National Park (Greenwater Valley), Piute-El Dorado, and Desert Tortoise Conservation Center; between Superior-Cronese and Death Valley National Park (west); between Chemehuevi and Pinto Mountains, Chuckwalla; between Desert Tortoise Conservation Center and Desert National Wildlife Refuge and Piute-El Dorado; between Mormon Mesa and Death Valley National Park (Greenwater Valley) and Lake Mead National Recreation Area; between Lake Mead National Recreation Area and Desert National Wildlife Refuge; and between Beaver Dam Slope and Gold Butte-Pakoon and Upper Virgin River (Averill-Murray et al. 2013).

Table III.7-34
Desert Tortoise Recovery Units in the DRECP Plan Area

Recovery Unit	Reserve	Acreage
Colorado Desert	High Priority Habitat	393,000
	Linkage	469,000
	TCA	3,131,000
	Colorado Desert Total	*3,993,000*
Eastern Mojave	Linkage	784,000
	TCA	2,096,000
	Eastern Mojave Total	*2,880,000*
Western Mojave	Linkage	1,208,000
	TCA	2,326,000
	Western Mojave Total	*3,533,000*
	Grand Total	**10,406,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

The following are salient points relating to this species' population trends and threats.

- Long-term study plots and other studies of the Mojave population of desert tortoise demonstrate "appreciable declines" at the local level in many areas, and that the identified downward trend of the species in the western portion of the range at the time of the federal listing as threatened in 1990 was valid and is ongoing (USFWS 2011a). Results from the USFWS rangewide monitoring show increases in density of adults in the four TCAs in the Northeastern Mojave Recovery Unit, but declines in all but two TCAs in the other four recovery units. In 2004 there were an estimated 126,346 adult tortoises in the 17 TCAs, with an overall loss of 40,660 adult tortoises by 2014 (USFWS 2015).
- Threats and environmental stressors for the desert tortoise include habitat loss, fragmentation, and degradation, collecting, disease or predation, climate change and drought, fire, and recreational and non-recreational land uses (USFWS 2011a).

Flat-Tailed Horned Lizard

The flat-tailed horned lizard (*Phrynosoma mcallii*) is a state candidate for endangered listing and California Species of Special Concern and is both a BLM and USFS special-status species. Flat-tailed horned lizards occupy the hottest and most barren areas of the Colorado/Sonoran Desert and occur on stabilized sand dunes that fall within the

creosote-white bursage series of Sonoran desert scrub. The range for flat-tailed horned lizard begins near the confluence of the San Gorgonio and Whitewater rivers in Riverside County, and extends south and east through the Coachella Valley into the DRECP Plan Area in Imperial County. The following are salient points relating to this species' population trends and threats.

- Within the DRECP Plan Area, flat-tailed horned lizard are found on both sides of the Salton Sea, extending west into Borrego Valley with small extensions into the lower portions of the Coyote Creek Watershed, around Clark Dry Lake, north of the Fish Creek Mountains, and southwest along San Felipe Creek. They are found on the Carrizo Wash east of Bow Willow, and may be found within the Carrizo Badlands. Their range extends east across East Mesa and the Algodones Dunes to Pilot Knob Mesa.
- The major identified threats to this species are habitat fragmentation and population isolation, agricultural development, urbanization, off-highway vehicle (OHV) use, highways, canals, railroads, military activities, utilities, predation, mining and mineral material extraction, geothermal power development, oil and gas development, wind turbines, landfills, exotic plants, fire, pesticide use, land disposal, cattle grazing, and other ground disturbance activities (Flat-tailed Horned Lizard ICC 2003; 76 FR 14223).
- The primary threat to this species is permanent habitat loss through urban and agricultural expansion (Young 2010). The threat of predation by both native and non-native predators is increased within several hundred meters along the edge between native intact habitat and agricultural development.

Mojave Fringe-Toed Lizard

The Mojave fringe-toed lizard (*Uma scoparia*) is a California Species of Special Concern and a BLM Special-Status Species. The Mojave fringe-toed lizard is only found in and immediately around areas of the Mojave Desert that contain deposits of Aeolian (fine windblown) sands, which are typically associated with dunes, washes, hillsides, margins of dry lakes, and sandy hummocks. Within the DRECP Plan Area, Mojave fringe-toed lizards occur in sand dune complexes within the three major river drainages in the DRECP Plan Area: the Amargosa, Mojave, and Colorado. The following are salient points relating to this species' population trends and threats.

- There is limited information on population trends for this species (Hollingsworth and Beaman 2001; Bureau of Land Management 2002), but threats to the species habitat are known. Murphy et al. (2006) documents the extirpation of the species at four sites where they were previously reported (i.e., Harper and El Mirage dry lakes, Piute Butte, and Lovejoy Buttes).

- Direct disturbances to loose windblown sand habitat can include OHV use, the infestation and stabilization of dune sands by invasive exotic species (e.g., Sahara mustard [*Brassica tournefortii*]), solar development, and urban development. Direct disturbances to Mojave fringe-toed lizards include increases in local predators (e.g., common raven).

Tehachapi Slender Salamander

The Tehachapi slender salamander (*Batrachoseps stebbinsi*) is state-listed as threatened in California and is a BLM Special-Status Species. The Tehachapi slender salamander inhabits moist canyons and ravines in oak and mixed woodlands. Within the DRECP Plan Area, the Tehachapi slender salamander occurs only in Kern and possibly Los Angeles counties. Reports are from the Tehachapi Pass area near SR-58, Caliente Creek Road near the mouth of Big Last Chance Canyon, Silver Creek, in and near Indian Creek, and between Tollgate Canyon and Stevenson Creek about 7 miles north–northeast of SR-58. The following are salient points relating to this species' population trends and threats.

- The Tehachapi slender salamander occurs in two main geographically separated distinct population segments (DPSs): (1) in the Caliente Creek drainage in the Paiute Mountains at the junction of the Sierra Nevada and Tehachapi mountains and (2) in the Tehachapi Mountains extending west to Fort Tejon State Park (76 FR 62900–62926).
- Population trends of the Tehachapi slender salamander are unknown. However, all documented occurrences are considered to be extant, although individual populations are small and localized (Hammerson 2009).
- Threats to the species include habitat disturbance caused by development. Species habitat is also potentially threatened by feral pig (*Sus scrofa*) (Hansen and Wake, pers. comm. 2008), road construction, mining, and cattle grazing, as well as flood control projects. Climate change may also impact the species.

III.7.6.1.2 Birds

Least Bell's Vireo

The least Bell's vireo (*Vireo bellii pusillus*) is state-listed as endangered and federally listed as endangered. Least Bell's vireo is listed as a Bird of Conservation Concern by the USFWS within the Mojave Desert Bird Conservation Regions. This species is largely associated with dense, stratified willow riparian woodlands. Recent records of least Bell's vireo in the DRECP Plan Area are from near Lancaster and Palmdale, north of Hesperia, north of Victorville, southwest of Yucca Valley, along Carrizo Creek in Anza-

Borrego Desert State Park, and along the Owens River. The following are salient points relating to this species' population trends and threats.

- The USFWS records show a tenfold increase in the least Bell's vireo population since its listing under the federal ESA in 1986, from 291 to 2,968 known territories, with "tremendous" growth of the vireo populations in specific areas in San Diego and Riverside counties and lower but still significant growth in Orange, Ventura, San Bernardino, and Los Angeles counties (USFWS 2006a). However, there have been significant declines in least Bell's vireo populations in Santa Barbara County since its original listing, while Kern, Monterey, San Benito, and Stanislaus Counties have not supported any sustained populations (USFWS 2006a).
- Historic loss of riparian habitat associated with agricultural practices, urbanization, and exotic plant invasion has contributed to decline of the species (USFWS 2006a). Loss of breeding habitat due to water source alteration (e.g., flood control and channelization), urbanization, and livestock grazing also threatens the species. In addition, nest parasitism by the brown-headed cowbird (*Molothrus ater*) has greatly reduced nest success throughout most of its breeding range and has been suggested as a primary cause for decline throughout California. Other threats to this species' habitat include urban and suburban development on floodplains, the presence of large areas of invasive plants such as tamarisk and giant reed (*Arundo donax*), and OHV activity (Wildlife Action Plan Team 2006).

Bendire's Thrasher

Bendire's thrasher (*Toxostoma bendirei*) is a California Species of Special Concern, a BLM Special-Status Species, and a USFWS Bird of Conservation Concern. Bendire's thrashers typically breed in open grasslands, shrubland, or woodland with scattered trees and shrubs. Within the DRECP Plan Area, individuals occur at the Mojave National Preserve, east of Barstow, in and near Lucerne Valley, within or near Yucca Valley, near the junction of I-8 and SR-177, and near Lake Havasu City (Shuford and Gardali 2008). The following are salient points relating to this species' population trends and threats.

- Population status and trends for Bendire's thrashers are limited. It has been estimated that the population may be fewer than 200 pairs throughout California (Remsen 1978).
- Although more research needs to be conducted, Remsen (1978) suggests the Bendire's thrasher is threatened by habitat destruction/alteration (specifically with the harvesting of Joshua trees and yucca), overgrazing, and OHV use in their breeding habitats. This species may also be threatened by loss of breeding habitat to urban and agricultural development, as well as military operations (Shuford and Gardali 2008). However, without any existing quantitative information regarding

population densities, most of the information on threats comes from anecdotal descriptions of the species (England and Laudenslayer 1989a, 1989b).

Burrowing Owl

The burrowing owl (*Athene cunicularia*) is a California Species of Special Concern and is designated as a BLM Special-Status Species and USFWS Bird of Conservation Concern. Burrowing owls occur in grasslands, deserts, sagebrush scrub, agricultural areas (including pastures and untilled margins of cropland), earthen levees and berms, coastal uplands (especially by over-wintering migrants), and urban vacant lots, as well as the margins of airports, golf courses, residential developments, and roads. Burrowing owls occur across most of the Mojave and Sonoran deserts of Inyo, eastern Kern, northern Los Angeles, San Bernardino, eastern Riverside, eastern San Diego, and Imperial counties, but are less common from Inyo County south through the eastern Mojave Desert. They are particularly common in agricultural areas, where the banks of irrigation ditches and roadsides provide suitable nesting sites and adjacent fields provide abundant invertebrate prey. The following are salient points relating to this species' population trends and threats.

- The overall range of the burrowing owl in California has not drastically changed from that described by Grinnell and Miller (1944), but the species has disappeared or greatly declined as a breeding bird in many areas that were once occupied (DeSante et al. 2007; Gervais et al. 2008; Wilkerson and Siegel 2010). By one recent estimate (Miller 2007), the burrowing owl has functionally disappeared as a breeding species from 22% of its former range and continues to decline in an additional 23% of its range.
- The most immediate threats to the burrowing owl are the conversion of grassland habitat to uses other than livestock grazing and the loss of agricultural hay, grass, and alfalfa lands to development or conversion to unsuitable crops like cotton, vineyards, orchards, corn, and sugarcane (Gervais et al. 2008, Wilkerson and Siegel 2010). Direct causes of mortality in burrowing owls include predation by hawks, owls, badgers, coyotes foxes, domestic dogs and cats, and others (Poulin et al. 2011); vehicular collisions; wind turbines; barbed wire fences; shooting; road maintenance; tilling, pesticide application and other agricultural practices; and disease and parasites (Gervais et al. 2008; Poulin et al. 2011). Eradication programs that have decimated rodent populations have, in turn, decreased the abundance of key prey available for burrowing owls.

California Black Rail

The California black rail (*Laterallus jamaicensis coturniculus*) is state-listed as threatened and fully protected, a USFWS Bird of Conservation Concern, and a BLM Special-Status

Species. Suitable habitat includes salt marshes, freshwater marshes, and wet meadows. Within the DRECP Plan Area, the California black rail occurs primarily along the Lower Colorado River from the Laguna Diversion Dam to about the head of Ferguson Lake, although there are occurrences near Parker, at the Dos Palmas Preserve Area of Critical Environmental Concern; on the New River near Seeley and at the Salton Sea; and near the All-American Canal southeast of El Centro. The following are salient points relating to this species' population trends and threats.

- Evens et al. (1991) reported from their surveys of the Lower Colorado River/Salton Trough region that "subpopulations were small and isolated" and that "[t]he causes of this downward trend—all related to habitat loss or degradation—are pervasive and ongoing." Conway and Sulzman (2007, p. 996) delivered a similar conclusion: "Our data suggest that degradation and elimination of suitable emergent marshes over the past 25 to 30 years has caused significant reduction in black rail distribution in Southern California and Arizona."
- Human impacts on black rails include shooting and trapping, contaminants, collisions, effects of research, and habitat impairment. Specifically addressing the Lower Colorado River/Salton Trough populations, Conway and Sulzman (2007) identify degradation and loss of suitable emergent marsh habitat as the principal threat to the species. They also note declines in habitat suitability due to the spread of tamarisk.

California Condor

The California condor (*Gymnogyps californianus*) is federally and state-listed as endangered and is also a California fully protected species. California condors are primarily a cavity nesting species and typically nest in cavities located on steep rock formations or in the burned out hollows of old-growth conifers (e.g., coast redwood [*Sequoia sempervirens*] and giant sequoia trees [*Sequoiadendron giganteum*]) (Koford 1953; Snyder et al. 1986). Less typical nest sites include cliff ledges, cupped broken tops of old-growth conifers, and in several instances, nests of other species (Snyder et al. 1986; USFWS 1996). The California condor occurs principally along the western edges of the DRECP Plan Area, specifically within the Tehachapi Mountains east of I-5, and portions of the Los Padres National Forest west of I-5. At this time, nesting has not been documented in the DRECP Plan Area; condor use of the DRECP Plan Area is currently limited to foraging and roosting. The following are salient points relating to this species' population trends and threats.

- Comprehensive counts of the species that began in 1982 confirmed that the wild population declined from an estimate of 21 individuals in 1982, to 19 individuals in 1983, 15 individuals in 1984, and 9 individuals in 1985. On April 19, 1987, the last wild California condor was captured and taken to the San Diego Wild Animal Park.

Beginning in 1992, captive condors began to be released back into the wild, with increasing numbers being released in succeeding years. As of July 31, 2013, there were 424 California condors in the world population, including 201 in captivity and 223 in the wild (USFWS 2013a). The wild population includes 123 in central and Southern California, of which approximately 56 (not including 6 young still in the nest) currently inhabit Southern California and have the potential to visit portions of the DRECP Plan Area. The remaining wild population includes 30 birds in Baja California and 70 in Arizona. Due to a combination of captive breeding and release, and wild nest reproduction, this population is steadily increasing and is expected to continue to increase, barring stochastic catastrophes.

- The decline of the condor population during the early 1900s has not been definitively linked to any particular cause, however, it was likely the result of high mortality rates due to direct persecution, collection of specimens, and secondary poisoning from varmint control efforts and 1,1,1-trichloro-2,2-bis(pchloro-phenylethane (DDT) (Snyder and Snyder 2005; D'Elia and Haig 2013). Lead poisoning may have been a contributing factor, but was not recognized as such until after 1980, at which time it became identified as a major cause of mortality that resulted in the recent decline (Janssen et al. 1986; Bloom et al. 1989; Pattee et al. 1990; Cade 2007; Grantham 2007; Hall et al. 2007). Other recent documented sources of mortality include predation, powerline collision, micro-trash, fire, and shooting (USFWS 2013b).

Gila Woodpecker

The Gila woodpecker (*Melanerpes uropygialis*) is state-listed as endangered in California. This species is also designated as a BLM Special-Status Species and a USFWS Bird of Conservation Concern. Gila woodpeckers breed in cacti or trees with large trunks. Suitable habitats include riparian woodlands, uplands with concentrations of large columnar cacti, old-growth xeric-riparian wash woodlands, urban or suburban areas, and agricultural areas. Within the DRECP Plan Area, Gila woodpeckers have been recorded along or in close proximity to the Colorado River and within the Imperial Valley, particularly south of the Salton Sea, and in desert washes with microphyll woodlands as far west as Joshua Tree National Park and Desert Center. The following are salient points relating to this species' population trends and threats.

- Gila woodpecker populations have declined significantly in southeast California (Rosenberg et al. 1991; Kaufman 1996), possibly due to the clearing of woodlands in the Colorado River Valley and Imperial Valley and nest-site competition with European starlings (Garrett and Dunn 1981). Rosenberg et al. (1991) indicated that although the species was formerly more common and widespread in Lower

Colorado River Valley, it had become restricted to relatively few areas where some tall trees were retained in native habitats.

- Threats and environmental stressors to Gila woodpeckers in the DRECP Plan Area include habitat loss and potential nest site competition with European starlings. In the southwestern United States, human development and the spread of invasive species have fragmented and degraded riparian woodland and desert habitat, adversely affecting Gila woodpecker populations.

Golden Eagle

The golden eagle (*Aquila chrysaetos)* is federally protected under the Bald and Golden Eagle Protection Act and MBTA. It is also a USFWS Bird of Conservation Concern and BLM Special-Status Species. The golden eagle is also fully protected in California and is considered a CDFW Watch List species. Golden eagles use nearly all terrestrial habitats of the western states, occurring primarily in mountainous canyon land, rimrock terrain of open desert, and grassland areas. The golden eagle is an uncommon permanent resident and migrant throughout the DRECP Plan Area, and may occupy nearly every mountain range in the DRECP Plan Area; BLM-identified "Key Raptor Areas" include the Granite, El Paso, and Newberry mountains, and Red Mountain, Stoddard Ridge, and Daggett Ridge (Raptor Research Foundation 1989). Other important occupied habitat is found in the Clark Mountain Range, Tehachapi Mountains, southern Sierra Nevada Mountains, and Calico Mountains.

The following are salient points relating to this species' population trends and threats.

- This species was once a common resident throughout the open areas of California but numbers are now reduced near human population centers (Kochert et al. 2002). Golden eagle territory occupancy is variable from year to year, productivity is generally low, and most territories contain several alternate nests (La Pré pers. comm. 2011).
- Golden eagle declines are attributed primarily to habitat degradation and human-induced disturbances and mortality (Kochert et al. 2002). Additional threats include secondary poisoning, poaching, electrocution from distribution and utility lines, wire strikes, wind turbine strikes, and lead poisoning (Remsen 1978; Thelander 1974).

Greater Sandhill Crane

The greater sandhill crane (*Grus canadensis tabida*) is state-listed as threatened and a fully protected species in California. It is also a BLM Special-Status Species. Greater sandhill cranes are found primarily in open freshwater wetlands, including shallow marshes and wet meadows, but may use agricultural fields as well. They nest in moist areas at the margins of extensive wet meadows and marshes. Sandhill cranes are winter visitors to the

DRECP Plan Area, overwintering mainly in the Lower Colorado River Valley (LCRV), in the Imperial Valley, and at the southern end of the Salton Sea. The following are salient points relating to this species' population trends and threats.

- The LCRV population is currently the least numerous of the migratory crane populations (Kruse et al. 2011). Aerial surveys of the LCRV populations suggest that the overall numbers are increasing at a rate of about 3% per year, from an estimated 1,900 in 1998 to 2,415 counted in 2011 (Kruse et al. 2011). The portion of the DRECP Plan Area total numbers overwintering at the Sonny Bono Salton Sea National Wildlife Refuge increased in parallel with the overall increase.
- The most significant current threat to the greater sandhill crane subspecies appears to be habitat loss and degradation, especially on the wintering grounds in California and Florida, the nesting areas in the Midwest, and migration stopovers, especially the Platte River (Meine and Archibald 1996).

Mountain Plover

Mountain plover (*Charadrius montanus*) is a California Species of Special Concern, a USFWS Bird of Conservation Concern, and a BLM Special-Status Species. This species occupies open, flat lands or sparsely vegetated areas, including xeric shrublands, short-grass prairie, and barren agricultural fields at high elevations. Within the DRECP Plan Area, mountain plover occurs south of or along the eastern edge of the Salton Sea, near Palmdale, west of Lancaster, and in the Harper Lake area. The following are salient points relating to this species' population trends and threats.

- In California, the wintering range for mountain plover includes low elevation interior valleys and plains. In the Imperial Valley, where there is the largest known concentration of wintering plovers, preferred foraging habitats include harvested alfalfa and Bermuda grass fields that have been grazed by domestic sheep and Bermuda grass fields, wheat, and other grass fields that have been burned post-harvest (Knopf and Wunder 2006; Molina 2011, 2012).
- Although wintering mountain plover populations in California appear to have experienced a significant decline over previous decades, more recent wintering numbers, from 2000 onward, have not shown a similar trend.
- Mountain plovers are threatened by loss and degradation of breeding and wintering habitat, predation, severe weather conditions during nesting and fledging, and direct persecution by humans (McGaugh 2006).

Swainson's Hawk

Swainson's hawk (*Buteo swainsoni*) is state-listed as threatened in California and is a USFWS Bird of Conservation Concern. Swainson's hawks occur primarily in grassland, but they are also found in sparse shrubland, open woodlands, and grain and hay croplands. They generally nest in isolated trees, narrow bands of vegetation, or along riparian corridors in grassland, shrubland, and agricultural landscapes. Breeding populations inside the DRECP Plan Area have been reported in the Antelope Valley, Owens River Valley, and at the Mojave National Preserve. Other occurrences are in the western Mojave region along the base of the San Gabriel and Tehachapi mountain ranges, as well as scattered occurrences in the Fremont Valley, the Ridgecrest/China Lake Naval Air Weapons Station, and near Haiwee Reservoir. The following are salient points relating to this species' population trends and threats.

- Most breeding pairs within the DRECP area are located in the western Mojave along the base of the San Gabriel and Tehachapi Mountains and in the Antelope Valley.
- In the DRECP Plan Area, in addition to alfalfa fields in the Antelope Valley, Swainson's hawks may also forage in native and non-native grasslands, Joshua tree woodlands, and other desert scrub habitats that support a suitable prey base.
- Main threats to Swainson's hawk in California include riparian habitat loss and agricultural and urban development in the Central Valley, urbanization in the coastal valleys and plains, and a contracting range of Joshua trees and riparian habitats in the Mojave Desert; and chronic and acute pesticide poisoning.

Tricolored Blackbird

The tricolored blackbird (*Agelaius tricolor*) is a federal candidate for listing and is state-listed as endangered. This species is also a BLM Special-Status Species and a USFWS Bird of Conservation Concern. Tricolored blackbirds breed in freshwater wetlands dominated by cattails or bulrushes, and nest in willows, thistles, or nettles (*Urtica* spp.). They forage in rice fields, lightly grazed pasture, dairies, or alfalfa fields. Tricolored blackbirds breed in lowland areas in the western and central portions of the DRECP Plan Area, in eastern Kern County from Ridgecrest along the base of the Tehachapi Mountains to Antelope Valley, around Palmdale and Lancaster in northeast Los Angeles County. One of the major colonies in that area, Piute Ponds at EAFB) is now unoccupied (National Audubon Society 2013). A colony in Leona Valley 10 miles west of Palmdale remained occupied in 2012 (Meese, pers. comm. 2014). The following are salient points relating to this species' population trends and threats.

- Local, regional, and statewide tricolored blackbird populations experienced major declines between 1994 and 2013. Results of the Audubon California 2011 statewide

survey (Kyle and Kelsey 2011) show a dramatic drop in the species population numbers throughout the state: in all, slightly fewer than 260,000 birds were observed compared to 395,000 in the 2008 survey, a 33% decrease in the population.

- The greatest threats to this species are the loss and degradation of habitat as a result of human activities (Beedy and Hamilton 1999). One of the main causes for population decline has been the near elimination of native cattail wetland complexes throughout central California by agricultural expansion and conversion of wetlands (Kyle and Kelsey 2011). Other threats to the species include predation of fledglings and adults by black-crowned night herons (*Nycticorax nycticorax*) and ravens (Hamilton 2004), and the application of herbicides and pesticides. Loss of nesting habitat in the western Mojave Desert occurred as alfalfa farming became economically infeasible. Irrigation water that had flowed off alfalfa fields in northeastern Los Angeles County and eastern Kern County had supplied marshes where tricolored blackbirds once nested (e.g., Koehn Lake).

Western Yellow-Billed Cuckoo

The western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is federally listed as threatened and state-listed as endangered in California. Western yellow-billed cuckoo is also a USFWS Bird of Conservation Concern and is a BLM Special-Status Species. It is currently proposed for federal listing as a threatened species under the ESA (78 FR 61622–61666). Breeding habitat primarily consists of large contiguous areas of riparian habitat, particularly cottonwood, mesquite, and willow riparian woodlands containing dense thickets near slow-moving water sources. Within the DRECP Plan Area, the western yellow-billed cuckoo occurs principally along the Colorado River, Alabama Hills near Lone Pine, the Laguna Dam area of the Colorado River north of the Cibola National Wildlife Refuge, the Imperial National Wildlife Refuge area, and the Palo Verde Ecological Reserve in Riverside County. Within the DRECP area there are other two sites considered potentially suitable for restoration/creation for yellow-billed cuckoo nesting habitat: along Hogback Creek in the Alabama Hills (Los Angeles Department of Water and Power 2009) and the Amargosa River (BLM 2006), both in Inyo County. The following are salient points relating to this species' population trends and threats.

- The western yellow-billed cuckoo suffered substantial range reductions in the twentieth century due to loss of riparian habitat (Laymon and Halterman 1987). Within the DRECP Plan Area, the majority of California Natural Diversity Database (CNDDB) records are from the Colorado River (CDFW 2013a). Once considered abundant throughout the lower Colorado River, the species' numbers dramatically declined during surveys in the 1970s and 1980s.

- The western yellow-billed cuckoo is sensitive to habitat fragmentation and degradation of riparian woodlands due to agricultural and residential development (Hughes 1999). Groundwater pumping and the replacement of native riparian habitats by invasive non-native plants, especially tamarisk, have substantially reduced the area and quality of available breeding habitats for yellow-billed cuckoo (75 FR 69222–69294). Additional threats include pesticides and climate change.
- The requirement of large habitats of 50- to 100-acre contiguous multi-stored riparian forest for suitable nesting habitat (Laymon and Halterman 1985; Laymon et al. 1997) may require considerable investment to enhance habitat adequately for a breeding population.

Willow Flycatcher (Including Southwestern)

The willow flycatcher (*Empidonax traillii*) is state-listed as endangered and the southwestern willow flycatcher subspecies (*E. t. extimus*) is federally listed as endangered. In California, nesting southwestern willow flycatchers are restricted to riparian habitats occurring along streams or in montane meadows, generally in habitats with a dense mid-story and understory and often a dense canopy. Willow flycatchers, including the southwestern willow flycatcher subspecies, also use riparian habitats as stopover habitat during migration, as well as non-riparian habitats, including shrublands, grasslands, and agriculture. Within the DRECP Plan Area, breeding southwestern willow flycatchers have been found at five general locations: Owens River Valley, Mojave River, San Felipe Creek (a tributary of the Salton Sea), the Lower Colorado River between Hoover and Parker, and the Lower Colorado River between Parker and the U.S.–Mexico border. Willow flycatchers, not identified to subspecies, have been reported in several regions of the DRECP Plan Area, including Amargosa Canyon, Ridgecrest and the China Lake Naval Air Weapons Station, the Fremont Valley in the western Mojave Desert, the southern Sierra Foothills west of Red Rock Canyon State Park, the cities of Mojave and California City, Galileo Park north of 20 Mule Team Parkway, the southwestern portion of EAFB, the western portion of Mojave National Preserve, the Kingston Range, the Morongo Valley, Lake Tamarisk Golf Course in the Chuckwalla Valley, and north of Niland east of the Salton Sea. The following are salient points relating to this species' population trends and threats.

- Within the DRECP Plan Area, significant declines have occurred along the Lower Colorado River, and occupied sites have declined in the Mojave River (Durst et al. 2008).
- The primary threat to the southwestern willow flycatcher is loss, modification, and fragmentation of suitable riparian habitat (Sogge et al. 2010). The specific primary causes for loss and modification of riparian habitats have been dams and reservoirs, water diversion and groundwater pumping, channelization, flood control, agriculture, recreation, and urbanization (Sogge et al. 2010).

- An important factor in population decline is thought to be brown-headed cowbirds which parasitize southwestern willow flycatcher nests and make nests more vulnerable to further predation (Stumpf et al. 2012).

Yuma Ridgway's Rail

The Yuma Ridgway's rail (*Rallus obsoletus yumanensis*) is a state-listed threatened and a fully protected species in California, and is a federally listed endangered species. The Yuma Ridgway's rail breeds in freshwater marshes, especially in areas with cattails and bulrush. It prefers areas with tall (greater than 6 feet) emergent vegetation and shallow (less than 12 inches) open water. Yuma Ridgway's rail disperse through wide areas of the southwest, with most dispersing clapper rails assumed to be subadults evicted from natal territories (Zembal et al. 1985), unpaired males seeking lower-density populations to establish territories, or adult rails displaced from established territories (Smith 1975; Bennett and Ohmart 1978). Colonization events and dispersal records have been documented in isolated patches of suitable habitat across southern Nevada, central and eastern Arizona, and the Mojave-Sonoran deserts in California. Within the DRECP Plan Area, the Yuma Ridgway's rail occurs along the Lower Colorado River from Lake Havasu to near Yuma, Arizona, and in the Imperial Valley at the Salton Sea and along the All-American Canal, the New River, and the Holtville main drain. The following are salient points relating to this species' population trends and threats:

- The Yuma Ridgway's rail in the United States has shown recent range extensions northward from the Colorado River Delta and the southern end of the Colorado River into Lake Mead and the Virgin River, indicating that the species is reproducing enough to support such expansion (USFWS 2006b, 2010).
- Habitat destruction and modification is the primary threat to the Yuma Ridgway's rail (USFWS 2010a). Environmental contaminants may also pose threats to the species. Two Yuma Ridgway's rails have been found dead at solar project sites in the last year and half.
- Since 2006, a consistent survey protocol began to be used throughout the United States. The rail population has fluctuated with a high of 822 in 2007 and a low of 431 in 2013 with a declining trend since 2009 (671 in 2009, 570 in 2010, 565 in 2011, 435 in 2012, and 431 in 2013).

III.7.6.1.3 Fish

Desert Pupfish

The desert pupfish (*Cyprinodon macularius*) is both state-listed and federally listed as endangered. Found in shallow water of desert springs, small streams, and marshes, this

species tolerates high salinities, high water temperatures, and low dissolved-oxygen concentrations. Pupfish prefer clear water, with rooted or unattached aquatic plants, restricted surface flow, or sand–silt substrates. Within the DRECP Plan Area, the desert pupfish occurs in San Felipe Creek/San Sebastian Marsh, Salt Creek (within the Dos Palmas Conservation Area of the Coachella Valley Multiple Species Habitat Conservation Plan), Salton Sea, irrigation drains of the Salton Sea, and a wash near Hot Mineral Spa. The following are salient points relating to this species' population trends and threats.

- The desert pupfish populations in Salt Creek and San Felipe Creek are stable to increasing (Keeney 2010a, cited in USFWS 2010b). In addition, there are a number of refuge or captive populations of desert pupfish in California at a variety of sites (USFWS 2010b).
- Threats to the species include loss and degradation of suitable habitat through groundwater pumping or water diversion; contamination from agricultural return flows, as well as other contaminants; and physical changes to water properties involving suitable water quality; the effect of disease, competition, or predation; inadequate regulatory mechanisms; and endocrine disruptors.

Mohave Tui Chub

The Mohave tui chub (*Siphateles [Gila] bicolor mohavensis*) is state- and federally listed as endangered and is a fully protected species in California. This species is associated with deep pools and sloughs. It generally requires a minimum water depth of 4 feet with some freshwater flow, and aquatic plants to provide foraging habitat and a substrate for egg attachment. Within the DRECP Plan Area, the Mohave tui chub occurs at Soda Springs and Morning Star Mine at Mojave National Preserve, Lark Seep at China Lake Naval Weapons Station, Camp Cady Wildlife Area, and the Lewis Center in Apple Valley.

The following are salient points relating to this species' population trends and threats.

- Mohave tui chub is only present at five locations, and remains extirpated from its historic habitat in the Mojave River. The 2009 USFWS 5-year Review for the species concluded that the species still meets the definition of endangered (USFWS 2009a).
- The two main threats to Mohave tui chub are the present threatened destruction, modification, or curtailment of its habitat or range; and other natural or man-made factors affecting its continued existence (hybridization, introduction of non-native or transplanted species, predation, or competition) (Williams et al. 1989, cited in USFWS 2009a).

Owens Pupfish

The Owens pupfish (*Cyprinodon radiosus*) is state- and federally listed as endangered and a fully protected species in California. Owens pupfish occurs in shallow water habitats in the

Owens Valley, where it prefers warm, clear, shallow water free of non-native fishes and areas of soft substrate for spawning. Within the DRECP Plan Area, Owens pupfish occurs only at Well 368 west of the Owens River. The following are salient points relating to this species' population trends and threats.

- Only four populations of Owens pupfish exist and all existing populations of the species are small, ranging from 100 to 10,000 individuals. Owens pupfish still faces a high degree of threat, but it also has a high recovery potential (USFWS 2009b).
- Threats to the species include loss of habitat resulting from cattail (*Typha* spp.) encroachment, and non-native predators including largemouth bass, smallmouth bass, brown trout, bluegill, mosquitofish (*Gambusia affinis*), crayfish (*Pastifasticus leniusculus*), and bullfrogs (*Rana catesbeiana*). Additionally, the Owens pupfish is highly vulnerable to extinction from stochastic (random) demographic, genetic, and catastrophic environmental events because the existing populations are small and isolated.

Owens Tui Chub

The Owens tui chub (*Siphateles bicolor snyderi*) is state- and federally listed as endangered and a fully protected species in California. The Owens tui chub occurs in low-velocity waters with well-developed beds of aquatic plants, rocks, and undercut banks with gravel bottoms. The Owens tui chub is limited to six isolated sites in the Owens Basin: Hot Creek Headwaters (AB Spring and CD Spring), Little Hot Creek Pond, Upper Owens Gorge, Mule Spring, and White Mountain Research Station (operated by the University of California). The DRECP Plan Area only includes the former Cabin Bar Ranch population, which was extirpated in 2003 (USFWS 2009c). The Mule Spring population (see Figure SP-F04 in Appendix B of Appendix Q to this document) is outside of the DRECP Plan Area boundary; no populations currently exist in the DRECP Plan Area. USFWS (1998) has proposed two conservation areas within the DRECP Plan Area: Black Rock and Southern Owens Dry Lake (the Cabin Bar Ranch population was found on the southwest shore of Owens Dry Lake). The following are salient points relating to this species' population trends and threats.

- Since its listing in 1985, three new populations of Owens tui chub have been established, bringing the current number to six. Four of these populations are in small, man-made or man-altered waters, and one is outside the historical range of the species at an artificial lake (Sotcher Lake). USFWS (2009c) indicates that the taxon is a subspecies that faces a high degree of threat and has a high potential for recovery.
- The major threat to the species is introgression (i.e., hybridization) with Lahontan tui chub (*Siphateles bicolor obesus*) (Chen et al. 2007), which has resulted in extirpation throughout most of its range (USFWS 2009c). Additional threats include extensive

habitat destruction and modification; an increase in emergent vegetation because it may provide cover for non-native predators of Owens tui chub, such as bullfrogs and crayfish; disease; predation by introduced non-native fish; and the inadequacy of existing regulatory mechanisms. Additionally, the Owens tui chub is highly vulnerable to extinction from stochastic (random) demographic, genetic, and catastrophic environmental events because the existing populations are small and isolated.

III.7.6.1.4 Mammals

Desert Bighorn Sheep

Desert bighorn sheep (*Ovis canadensis nelsoni*) is state-listed as fully protected under California Fish and Game Code Section 4700 and a BLM Special-Status Species. Bighorn sheep prefer visually open, steep, and rocky mountainous terrain. They occur in alpine dwarf-shrub, low sage, sagebrush, bitterbrush, pinyon–juniper, palm oasis, desert riparian, desert succulent shrub, desert scrub, subalpine conifer, perennial grassland, montane chaparral, and montane riparian habitats. Within the DRECP Plan Area, bighorn sheep range from the Last Chance Range near the northeastern portion of the DRECP Plan Area south to the Chocolate Mountains in the southeastern portion of the DRECP Plan Area. The following are salient points relating to this species' population trends and threats.

- Due to the nature of the habitats in which desert bighorn sheep live, their populations are relatively small in general. This makes them quite vulnerable to local extirpation and to the loss of genetic diversity through generic drift if isolated. Broad estimates of desert bighorn sheep population size indicate an increasing or at least stable population; local populations have shown more variability, with some local population declines (CDFG 2010).
- Desert bighorn sheep are threatened by loss and fragmentation of important habitats (e.g., lambing and feeding areas, escape terrain, water, travel, and dispersal routes), disease (potentially from livestock), predation, drought, potential resource competition, and negative interactions with humans (Wehausen 2006).

Burro Deer (Planning Species)

The burro deer (*Odocoileus hemionus eremicus*) is the desert dwelling subspecies of the widespread mule deer (*Odocoileus hemionus*) with no federal or state special status. The burro deer is a large ungulate that shifts seasonally between desert riparian washes and more open, mountainous terrain. Within the DRECP Plan Area, burro deer have been recorded along or near the Colorado River, including near Blythe and in the Palo Verde area. It also occurs in the Smoketree Valley area near Clemens Well in the valley between the

Orocopia and Chocolate mountains. The following are salient points relating to this species' population trends and threats.

- Burro deer are predominately associated with major river corridors and dry desert washes leading down to the Colorado River and other major rivers. In the hottest months deer are found close to permanent water and forage sources such as the Colorado River. However, with the onset of the summer monsoons in early August and September, burro deer may disperse to the desert mountains (Celentano and Garcia 1984).
- Burro deer are distributed in two primary herd areas north and south of I-10. These herds are vulnerable to fragmentation if key habitat linkages along this highway are not maintained, especially the linkages between the Mule and McCoy mountain ranges, and between the Chuckawalla and Palen ranges.
- Threats to Burro deer include loss and degradation of summer riparian habitat along the Colorado River associated with the activities of an increasing human population. Activities include increasing development, agriculture, recreational development, and flood control measures. Additional threats include poaching, road kill, drowning in canals, and competition from non-native grazing animals such as feral ass.

California Leaf-Nosed Bat

The California leaf-nosed bat (*Macrotus californicus*) is a California Species of Special Concern and a BLM Special-Status Species. The California leaf-nosed bat is primarily a cave and mine dwelling species, but has also been found in open bridge structures with cave-like chambers at either end. Roosts must maintain temperate microclimates year-round. California leaf-nosed bats forage in riparian and desert washes, and tinajas (water-carved natural rock pools). This species is generally concentrated in southern portions of the DRECP Plan Area, including Joshua Tree National Park; along the Lower Colorado River between Lake Havasu City and Yuma, Arizona; west of Blythe, California; and in the Cargo Muchacho Mountains northwest of Yuma, the Chocolate Mountains east of the Salton Sea, and the Clipper Mountains. The following are salient points relating to this species' population trends and threats.

- With possibly one exception, all California leaf-nosed bat roosts are now located in the desert. More recent censuses using standardized methods have revealed stable colony sizes for California leaf-nosed bats in the largest colonies.
- The two main threats to this species likely are disturbances of roost sites due to human entrance, abandoned mine closures (i.e., bat access eliminated), and renewed mining in historic districts (Brown 2005; Zeiner et al. 1990); and loss and degradation of desert riparian habitats (Brown 2005).

Desert Kit Fox (Planning Species)

The desert kit fox subspecies (*Vulpes macrotis arsipus*) is not listed as threatened or endangered and does not have special state or federal status. In the DRECP Plan Area, desert kit fox primarily occurs in open desert scrub habitats on gentle slopes. Creosote bush scrub is the most common habitat association for desert kit fox in California. Particularly dense populations are known to occur in sandy substrates, due to high prey populations and soils suitable for burrowing. The desert kit fox's range historically included the entire DRECP Plan Area. Although there is a general lack of recent distribution information for this subspecies, the desert kit fox's current distribution is considered to include the entire DRECP Plan Area. The following are salient points relating to this species' population trends and threats.

- Meany et al. (2006) state that kit fox populations "plummeted" in the last half of the 19th and early 20th century due to predator and rodent controls. They report that the kit fox population in Colorado may be close to extirpation, populations in Oregon and Idaho are extremely low, and populations in the Great Basin Desert in Nevada and Utah may be in decline. The only states Meaney et al. (2006) indicate may still have stable populations are Arizona, New Mexico, and Texas.
- Threats to desert kit fox include habitat degradation, loss, and fragmentation from development; roads; recreational activities including OHVs; rodenticide poisoning; noise associated with military activities; and grazing. The expansion and increased abundance of coyotes, which is the main predator of kit foxes, is also a threat (Meaney et al. 2006). A potentially devastating current threat to desert kit fox is canine distemper (Clifford et al. 2013).

Mohave Ground Squirrel

The Mohave ground squirrel (*Xerospermophilus mohavensis*) is state-listed as threatened in California. The Mohave ground squirrel occurs in a variety of desert shrubland habitats, and is most often found in Mojave creosote bush scrub, desert saltbush scrub, Mojave mixed steppe, desert sink scrub, desert greasewood scrub, shadscale scrub, and Joshua tree woodland. Within the DRECP Plan Area, the published Mohave ground squirrel range extends from Inyo County east of Owens Lake in the north to a few miles east of Rabbit Springs in Lucerne Valley in the south, and from the Granite Mountains in Fort Irwin in the east to the cities of Mojave, Lancaster, and Palmdale in the west (Leitner 2008).

Important areas for the conservation of the Mohave ground squirrel were established to inform planning efforts for conservation of this species' habitat for the DRECP. The original data included only a limited number of population centers and linkages described by Phil Leitner, PhD, of California State University, Stanislaus, in 2008. The data were revised in

2012 and 2013 based on input from Leitner and other Mohave Ground Squirrel experts. The habitats were defined using field observations, historical and current species occurrence records, habitat suitability, including disturbance analysis and the USGS 2013 habitat suitability model developed for Inman et al. (2013), expert input, and topography.

The following habitat types were described and their acreages within the DRECP Plan Area are included in Table III.7-35.

- Key Population Centers – These include habitat with high detection rates, evidence of breeding, and/or temporally persistent occurrence. They were digitized based on Leitner (2008, 2013a, 2013b), and expert input acquired during recent surveys and field observations.
- Habitat Linkages – These are hypothesized linkages based on the best available science. Linkages were based on detections, habitat suitability (from USGS model and disturbance analysis), potential corridors as defined by topography, Leitner (2008, 2013a, 2013b), expert input.
- Habitat Expansion Areas – The Mohave Ground Squirrel Technical Advisory Group Conservation Priorities document (MGS Technical Advisory Group 2010) describes expansion habitat for juvenile dispersal (up to 5 miles) and additional connectivity through contiguous blocks of habitat, lessening the dependence on hypothesized linkages. These areas were defined by buffering population centers to 5 miles and then removing unviable areas.
- Climate Change Extensions – Mohave ground squirrel are predicted to move north and west into suitable habitat providing refugia from drought. The boundaries of these areas were determined based on personal communications with Phil Leitner, observations based on climate change models, and suitable habitat and predictions in Inman et al. (2013).

Table III.7-35
Mohave Ground Squirrel Important Areas in the DRECP Plan Area

Mohave Ground Squirrel Important Area Type	Acreage
Key Population Center	675,000
Linkage	413,000
Expansion Area	563,000
Climate Change Extension	224,000
Total	**1,875,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

The following are salient points relating to this species' population trends and threats.

- Approximately 88% of the geographic area of known existing populations of the species, based on Leitner (2008), occur in the DRECP Plan Area (only a portion of the Coso Range–Olancha Core population is outside this area). The primary threat to the Mohave ground squirrel has been habitat loss and fragmentation (Gustafson 1993; Leitner 2008; MGS Technical Advisory Group 2010). Additional threats include prolonged drought and other impacts of climate change, predation, livestock and wild ungulate grazing, invasive species, and vehicle collisions; and to a lesser known degree, OHV use, rodenticides, pesticides, competition, and predation by common ravens.

Pallid Bat

The pallid bat (*Antrozous pallidus*) is a California Species of Special Concern and a BLM Special-Status Species. Pallid bats roost in caves, mines, hollow trees, bridges, barns, porches, and bat boxes. Foraging habitats include grasslands, oak savannah woodlands, open pine forests, talus slopes, and agricultural areas. Within the DRECP Plan Area, the pallid bat occurs in the Owens Valley, eastern Sierra Nevada Mountains, Providence Mountains, Kingston Range, Avawatz Mountains, Cady Mountains, Little San Bernardino Mountains, Hexie Mountains, Chocolate Mountains, Peninsular Range in east San Diego County, and the Twentynine Palms area of the Lower Colorado River. The following are salient points relating to this species' population trends and threats.

- Pallid bats are known to roost in association with other common species including Yuma myotis (*Myotis yumanensis*) and big brown bat (*Eptesicus fuscus*). However, Miner and Stokes (2005) reported that in roost surveys of these common pallid bat associates in San Diego County, very few pallid bat colonies were reported. Based on this apparent population decline, Miner and Stokes (2005) concluded that pallid bats are highly intolerant of urban development.
- As a colonial roosting species, pallid bats are particularly vulnerable to disturbances of roost sites through vandalism, extermination, and destruction of buildings used as roost sites (Hermanson and O'Shea 1983), as well as recreational activities such as rock climbing. Additional threats include a reduction in food availability due to pesticides or habitat modification or degradation such as conversion to agriculture, prescribed fires, and wildfires. Other potential threats include turbine strikes at wind energy facilities.

Townsend's Big-Eared Bat

The Townsend's big-eared bat (*Corynorhinus townsendii*) is a California Species of Special Concern and has recently been proposed for listing as a threatened species under the CESA and a BLM Special-Status Species. Within the DRECP Plan Area, Townsend's big-

eared bat is primarily associated with mines in the California desert, and also largely associated with man-made structures, tunnels, caves, and the basal hollows of old-growth redwood trees. Townsend's big-eared bats may occur throughout the DRECP Plan Area, but areas known to support substantial populations include the Owens Valley and areas east of the Sierra Nevada Range in Inyo County, the Providence Mountains in San Bernardino County, and the Lower Colorado River area in San Bernardino, Riverside, and Imperial counties.

The following are salient points relating to this species' population trends and threats.

- Past studies have shown a broad-ranging decline in Townsend's big-eared bat through large parts of its range in the western United States (i.e., mainly the *C .t. townsendii* and *C. t. pallescens* subspecies). The census by Pierson and Rainey (CDFG 1998) in California, conducted from 1987 to 1991, found substantial population declines over the previous 40 years, with a 52% loss in the number of maternity colonies, a 44% decline in the number of available roosts, a 55% decline in the total number of animals (primarily adult females), and a 32% decrease in the average size of remaining colonies.
- Townsend's big-eared bats are very sensitive to human disturbances, and a single disturbance of a maternity roost or hibernation site may cause abandonment (Zeiner et al. 1990; Kunz and Martin 1982). Wind energy facilities could also pose a threat to populations of the species. Townsend's big-eared bats in the DRECP Plan Area could be at elevated risk of turbine strikes or other associated causes (e.g., barotrauma) if a wind facility were located within a few miles of a day roost site.

III.7.6.1.5 Plants

Alkali Mariposa-Lily

Alkali mariposa-lily (*Calochortus striatus*) is a BLM Special-Status Species. Alkali mariposa-lily is a perennial bulbiferous herb that grows in seasonally moist alkaline habitats such as alkaline meadows and seeps, and ephemeral washes, within chaparral, chenopod scrub, and Mojavean desert scrub. Within the DRECP Plan Area, this species is distributed from Red Rock Canyon State Park southeast to Joshua Tree National Park, with the majority of occurrences on or close by EAFB. The following are salient points relating to this species' population trends and threats.

- Abundance figures are complicated by large fluctuations from year to year, making population trends difficult to assess (NatureServe 2011). Despite its relatively wide distribution, the majority of the populations are small with the exception of the metapopulation that ranges from Lancaster to EAFB (CDFW 2013b).

- Alkali mariposa-lily is threatened by urbanization, grazing, trampling, road construction, hydrologic alterations, and water diversions that lower the water table (CNPS 2011). It is also threatened by military operations, dumping, and grading (NatureServe 2011).

Bakersfield Cactus

Bakersfield cactus (*Opuntia basilaris* var. *treleasei*) is both state- and federally listed as endangered. Bakersfield cactus is a perennial stem succulent that grows primarily in chenopod scrub, including saltbush scrub; valley and foothill grassland; and occasionally in cismontane woodland, including blue oak woodland and riparian woodland. Within the DRECP Plan Area, this species has documented occurrences at Oak Creek Pass in the Tehachapi Mountains, near West Antelope Station, and east of Bean Canyon at the foothills of the Tehachapi Mountains, and at the North Sky River wind facility. Confirmed occurrences are near Oak Creek Road (Smith 2013). The following are salient points relating to this species' population trends and threats.

- Once likely more or less continuously east of Bakersfield, the current range of Bakersfield cactus consists of scattered fragments of these once larger populations (USFWS 2011b). A status survey in 2010 and 2011 determined the current state of the historical occurrences of Bakersfield cactus throughout its range with a minimum of 33 extant occurrences recorded (Cypher et al. 2011).
- The loss and modification of habitat from agricultural conversion, wind energy development, and urban, especially residential, development remain the largest threats to Bakersfield cactus (USFWS 2011b; Kentner, pers. comm. 2012). Threats also include oil development, OHV use, sand mining, and competition from non-native grasses. In addition, climate change, air pollution (including elevated nitrogen deposition), loss of pollinators, flooding, and loss of genetic diversity have been identified as potential new threats (USFWS 2011b).

Barstow Woolly Sunflower

Barstow woolly sunflower (*Eriophyllum mohavense*) is a BLM Special-Status Species. Barstow woolly sunflower is an annual herb that prefers sandy or rocky areas within chenopod scrub, Mojavean desert scrub, creosote bush scrub, and also occurs on playas. Within the DRECP Plan Area, this species occurs primarily close to Kramer Junction on EAFB, but has also been reported farther west near the Mojave Airport, near Buckhorn Lake, near Opal and Lane Mountains, and Barstow. The following are salient points relating to this species' population trends and threats.

- Population trends for this species are unknown at this time, but a multiyear, population-level study is underway. This is an annual plant with populations that

fluctuate greatly (by orders of magnitude) from year to year depending on conditions, and has a soil seed bank that also likely shows a remarkable amount of fluctuation.

- Threats to Barstow woolly sunflower include military activities, energy and subdivision development, sheep grazing, exotic plant species, OHV use, highway and road improvements, building, mining, dumping, and pipeline construction (NatureServe 2011; CNPS 2011; MacKay, pers. comm. 2012).

Desert Cymopterus

Desert cymopterus (*Cymopterus deserticola*) is a BLM Special-Status Species. Desert cymopterus is a perennial herb that grows in Joshua tree woodland, saltbush scrub, and Mojavean desert scrub vegetation types on loose, sandy soils. Within the DRECP Plan Area, this species occurs near Buckhorn Lake along the Kern County–Los Angeles County boundary north to the Black Hills and Fort Irwin, with the majority of occurrences located on or near EAFB southwest of Kramer Junction and at Cuddleback Lake northeast of EAFB. The following are salient points relating to this species' population trends and threats.

- Estimating population size for this species is difficult. Occurrences and population size fluctuate widely from year to year in response to climatic conditions, especially rainfall. Desert cymopterus is dependent upon frequent spring rains. Furthermore, this species may remain dormant underground as a taproot and may not emerge when there isn't enough rainfall, so the number of individuals underground could be greater than the number of individuals aboveground. Also, detectability may be low in years when plants only produce leaves and no inflorescence (NatureServe 2011).
- Desert cymopterus is potentially threatened by habitat alteration and destruction resulting from military activities on EAFB, the expansion of Fort Irwin, oil and gas development, utility construction, renewable energy development, OHV use, sheep grazing, Land Tenure Adjustment, and urban development (69 FR 64884–64889; CNPS 2011).

Little San Bernardino Mountains Linanthus

Little San Bernardino Mountains linanthus (*Linanthus maculatus*) has no federal or state designations, but is considered rare. Little San Bernardino Mountains linanthus is an annual herb that grows on loose, well-aerated, open sandy benches and flats on the margins of desert washes. Within the DRECP Plan Area, this species occurs in or near Joshua Tree National Park, Lucerne Valley, Two Hole Spring at the northeastern base of the San Bernardino Mountains, and along the western boundary of the DRECP Plan Area in San

Bernardino and Riverside counties. The following are salient points relating to this species' population trends and threats.

- Population trends are difficult to estimate for the species because population size in a given year appears to depend on environmental conditions and fluctuates greatly from year to year.
- Little San Bernardino Mountains linanthus is potentially threatened by habitat disturbance and destruction from urban expansion, OHV use, illegal dumping, invasive non-native species (CNPS 2011; CDFW 2013c), and flood control activities (CVAG 2006).

Mojave Monkeyflower

Mojave monkeyflower (*Mimulus mohavensis*) is a BLM Special-Status Species. Mojave monkeyflower is an annual herb that occurs in Joshua tree woodland and Mojavean desert scrub, specifically creosote bush. Within the DRECP Plan Area, a large population occurs southeast of Barstow to Ord Mountain, as well as northeast of Adelanto, at Hodge, and just south of the Black Mountains summit. The following are salient points relating to this species' population trends and threats.

- Population trends for Mojave monkeyflower are unknown at present, but a multiyear population-level study is underway. Population sizes fluctuate substantially from year to year, probably in response to the amount and timing of precipitation; as an annual, germination and establishment are dependent on the timing and amount of spring rains (MacKay 2006; NatureServe 2011).
- Threats to Mojave monkeyflower include development, mining, non-native plants, solar and wind energy projects, grazing, vehicles, and road development (CNPS 2011; NatureServe 2011; MacKay 2006). Additional potential threats include pipeline installation, quarries, and test pits adjacent to populations (MacKay 2006).

Mojave Tarplant

Mojave tarplant (*Deinandra mohavensis*) is not federally or state-listed, but is a BLM Special-Status Species. The Mojave tarplant is an annual herb that occurs in open moist sites in arid regions near desert margins, and within chaparral, coastal scrub, and riparian scrub. Within the DRECP Plan Area, Mojave tarplant is known from the desert slope of the southern Sierra Nevada Mountains in Kern County. The following are salient points relating to this species' population trends and threats.

- Because this species was only recently rediscovered (in 1994) there is little information available on population trends. Overall, there are 121 occurrences in Kern, Riverside,

and San Diego counties (CDFW 2013d) and most of these appear to have the number of individuals estimated only once, making it difficult to discern a population trend.

- Mojave tarplant is threatened by grazing, recreational activities, development, hydrologic alterations, road maintenance, and vehicles (CNPS 2011).

Owens Valley Checkerbloom

Owens Valley checkerbloom (*Sidalcea covillei*) is state-listed as endangered and is a BLM Special-Status Species. Owens Valley checkerbloom is a perennial herb that grows in moist alkaline meadows and seeps and saltbush scrub in fine, sandy loam with alkaline crusts. Within the DRECP Plan Area, this species occurs within the Owens River Valley ecoregion subarea. The following are salient points relating to this species' population trends and threats.

- Owens Valley checkerbloom occurs solely in mesic high-elevation alkaline meadow habitats in the Owens Valley River drainage. This species is highly restricted to a specialized habitat with very limited distribution.
- A cooperative project initiated in 1994 by the BLM, CDFW, and The Nature Conservancy to test the long-term survivorship of reintroduced Owens Valley checkerbloom demonstrated that the species can be successfully propagated and transplanted, allowing some flexibility in the response of management activities to suitable habitat areas disturbed by grazing or other surface disturbing threats.
- Threats to this species include cattle grazing, groundwater depletion, and the associated invasion by competing species.

Parish's Daisy

Parish's daisy (*Erigeron parishii*) is federally listed as threatened but is not state-listed. Parish's daisy is a perennial herb that occurs in Mojavean desert scrub and pinyon and juniper woodlands and is largely restricted to loose, carbonate alluvium, although it is occasionally found on other rock types. Within the DRECP Plan Area, this species is known from Joshua Tree National Park and on the University of California Natural Reserve System Burns Pinion Ridge Reserve. The following are salient points relating to this species' population trends and threats.

- The current population status of Parish's daisy is unclear. USFWS (2009d) notes that what constitutes an occurrence has been subjectively defined over various surveys, making it difficult to specify status or change in status of Parish's daisy since it was listed.

- The main threat to Parish's daisy is limestone mining because this species is mostly restricted to carbonate deposits (USFWS 2009d). Additional threats include energy development projects, OHVs, fuel-wood collection, fire suppression activities, camping, target shooting, road construction, and residential developments.

Triple-Ribbed Milk-Vetch

Triple-ribbed milk-vetch (*Astragalus tricarinatus*) is a federally listed endangered species but is not state-listed. Triple-ribbed milk-vetch is a perennial herb characterized as generally occurring in Joshua tree woodland and Sonoran desert scrub. Within the DRECP Plan Area, this species occurs at Wathier Landing, Catclaw Flat, Mission Creek, Dry Morongo Canyon and Wash, Big Morongo Canyon, Long Canyon, Coyote Hole Spring, Key's Ranch (note that this site is unvouchered or was not collected), and Orocopia Mountains. Many of these largest populations lie outside the DRECP Plan Area, and only relatively small populations are known within the DRECP Plan Area, primarily in the washes draining north from Joshua Tree National Park in the Yucca Valley area. The following are salient points relating to this species' population trends and threats.

- For the 5-year review of the species, USFWS estimated the known rangewide population to be less than 500 individuals (USFWS 2009e).
- Threats to the species within the DRECP Plan Area include maintenance of the crude oil pipeline and from OHV use. Its small population numbers make it vulnerable to stochastic events and anthropogenic events such as pipeline leaks (USFWS 2009e). New threats identified since the species' federal listing include wildland fire suppression activities, flooding, and climate change (USFWS 2009e) and exotic weed infestations resulting from increased vehicle and foot traffic (Amsberry and Meinke 2007).

III.7.6.1.6 Focus Species by Ecoregion Subarea

Cadiz Valley and Chocolate Mountains Ecoregion Subarea

The Focus Species known to occur within the Cadiz Valley and Chocolate Mountains ecoregion subarea are shown on Figure III.7-16 and detailed in Table III.7-36.

Table III.7-36
Focus Species Occurring within the Cadiz Valley and Chocolate Mountains Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Amphibians/Reptiles			
Agassiz's desert tortoise	*Gopherus agassizii*	FT	ST
Mojave fringe-toed lizard	*Uma scoparia*	BLM	CSC
Birds			
Bendire's thrasher	*Toxostoma bendirei*	BCC/BLM	CSC
Burrowing owl	*Athene cunicularia*	BCC/BLM	CSC
California black rail	*Laterallus jamaicensis coturniculus*	BCC/BLM	ST/FP
Gila woodpecker	*Melanerpes uropygialis*	BLM/BCC	SE
Golden eagle	*Aquila chrysaetos*	BLM	FP
Greater sandhill crane	*Grus canadensis tabida*	BLM/FS	ST/FP
Mountain plover	*Charadrius montanus*	BCC/BLM	CSC
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	FT/FS/BCC/BLM	SE
Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus*)	Southwestern: FE	SE
Yuma Ridgway's rail	*Rallus obsoletus yumanensis*	FE/BCC	ST/FP
Fish			
Desert pupfish	*Cyprinodon macularius*	FE	SE
Mammals			
Desert bighorn sheep	*Ovis canadensis nelsoni*	Desert: BLM	Desert: FP[3]
California leaf-nosed bat	*Macrotus californicus*	BLM/FS	CSC
Pallid bat	*Antrozous pallidus*	BLM/FS	CSC
Townsend's big-eared bat	*Corynorhinus townsendii*	BLM/FS	SC/CSC

1 Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern.

2 State Status – SE: California Endangered; ST: California Threatened; SC: Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; SR: State Rare. California Rare Plant Rank (CRPR, formerly known as the CNPS List)– CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere; CRPR 3: Plants which need more information; CRPR 4: Limited distribution – a Watch List.

3 Limited hunting allowed.

Imperial Borrego Valley Ecoregion Subarea

The Focus Species known to occur within the Imperial Borrego Valley ecoregion subarea are shown on Figure III.7-17 and detailed in Table III.7-37.

Table III.7-37
Focus Species Occurring within the Imperial Borrego Valley Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Amphibians/Reptiles			
Desert tortoise	*Gopherus agassizii*	FT	ST
Flat-tailed horned lizard	*Phrynosoma mcallii*	BLM/FS	SC/CSC
Birds			
Burrowing owl	*Athene cunicularia*	BCC/BLM	CSC
California black rail	*Laterallus jamaicensis coturniculus*	BCC/BLM	ST/FP
Gila woodpecker	*Melanerpes uropygialis*	BLM/BCC	SE
Golden eagle	*Aquila chrysaetos*	BLM	FP
Greater sandhill crane	*Grus canadensis tabida*	BLM/FS	ST/FP
Least Bell's vireo	*Vireo bellii pusillus*	FE/BCC	SE
Mountain plover	*Charadrius montanus*	BCC/BLM	CSC
Swainson's hawk	*Buteo swainsoni*	BLM/FS	ST
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	FT/FS/BCC/BLM	SE
Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus*)	Southwestern: FE	SE
Yuma Ridgway's rail	*Rallus obsoletus yumanensis*	FE/BCC	ST/FP
Fish			
Desert pupfish	*Cyprinodon macularius*	FE	SE
Mammals			
Desert bighorn sheep	*Ovis canadensis nelsoni*	Desert: BLM	Desert: FP[3]
California leaf-nosed bat	*Macrotus californicus*	BLM/FS	CSC
Pallid bat	*Antrozous pallidus*	BLM/FS	CSC
Townsend's big-eared bat	*Corynorhinus townsendii*	BLM/FS	SC/CSC
Plants			
Little San Bernardino Mountains linanthus	*Linanthus maculatus*	BLM	(CRPR 1B.2)

[1] Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern.

[2] State Status – SE: California Endangered; ST: California Threatened; SC: Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; SR: State Rare. California Rare Plant Rank (CRPR, formerly known as the CNPS List)– CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere; CRPR 3: Plants which need more information; CRPR 4: Limited distribution – a Watch List.

[3] Limited hunting allowed.

Kingston and Funeral Mountains Ecoregion Subarea

The Focus Species known to occur within the Kingston and Funeral Mountains ecoregion subarea are shown on Figure III.7-18 and detailed in Table III.7-38.

Table III.7-38
Focus Species Occurring within the Kingston and Funeral Mountains Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Amphibians/Reptiles			
Desert tortoise	*Gopherus agassizii*	FT	ST
Mojave fringe-toed lizard	*Uma scoparia*	BLM	CSC
Birds			
Bendire's thrasher	*Toxostoma bendirei*	BCC/BLM	CSC
Burrowing owl	*Athene cunicularia*	BCC/BLM	CSC
Golden eagle	*Aquila chrysaetos*	BLM	FP
Least Bell's vireo	*Vireo bellii pusillus*	FE/BCC	SE
Mountain plover	*Charadrius montanus*	BCC/BLM	CSC
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	FT/FS/BCC/BLM	SE
Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus*)	Southwestern: FE	SE
Fish			
Mohave tui chub	*Siphateles (Gila) bicolor mohavensis*	FE	SE/FP
Mammals			
Desert bighorn sheep	*Ovis canadensis nelsoni*	Desert: BLM	Desert: FP[3]
Pallid bat	*Antrozous pallidus*	BLM/FS	CSC
Townsend's big-eared bat	*Corynorhinus townsendii*	BLM/FS	SC/CSC
Plants			
Alkali mariposa-lily	*Calochortus striatus*	BLM	(CRPR 1B.2)

[1] Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern.

[2] State Status – SE: California Endangered; ST: California Threatened; CSC: California Species of Special Concern; FP: Fully Protected; SC: Candidate for listing; SR: State Rare. California Rare Plant Rank (CRPR, formerly known as the CNPS List)– CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere; CRPR 3: Plants which need more information; CRPR 4: Limited distribution – a watch list.

[3] Limited hunting allowed.

Mojave and Silurian Valley Ecoregion Subarea

The Focus Species known to occur within the Mojave and Silurian Valley ecoregion subarea are shown on Figure III.7-19 and detailed in Table III.7-39.

Table III.7-39
Focus Species Occurring within the Mojave and Silurian Valley Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Amphibians/Reptiles			
Desert tortoise	*Gopherus agassizii*	FT	ST
Mojave fringe-toed lizard	*Uma scoparia*	BLM	CSC
Birds			
Bendire's thrasher	*Toxostoma bendirei*	BCC/BLM	CSC
Burrowing owl	*Athene cunicularia*	BCC/BLM	CSC
Golden eagle	*Aquila chrysaetos*	BLM	FP
Tricolored blackbird	*Agelaius tricolor*	BLM/BCC	SE
Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus*)	Southwestern: FE	SE
Fish			
Mohave tui chub	*Siphateles (Gila) bicolor mohavensis*	FE	SE/FP
Mammals			
Desert bighorn sheep	*Ovis canadensis nelsoni*	Desert: BLM	Desert: FP[3]
Mohave ground squirrel	*Xerospermophilus mohavensis*	BLM	ST
Pallid bat	*Antrozous pallidus*	BLM/FS	CSC
Townsend's big-eared bat	*Corynorhinus townsendii*	BLM/FS	SC/CSC
Plants			
Alkali mariposa-lily	*Calochortus striatus*	BLM	(CRPR 1B.2)
Barstow woolly sunflower	*Eriophyllum mohavense*	BLM	(CRPR 1B.2)
Desert cymopterus	*Cymopterus deserticola*	BLM	(CRPR 1B.2)
Mojave monkeyflower	*Mimulus mohavensis*	BLM	(CRPR 1B.2)

1 Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern.

2 State Status – SE: California Endangered; ST: California Threatened; SC: Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; SR: State Rare. California Rare Plant Rank (CRPR, formerly known as the CNPS List)– CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere; CRPR 3: Plants which need more information; CRPR 4: Limited distribution – a Watch List.

3 Limited hunting allowed.

Owens River Valley Ecoregion Subarea

The Focus Species known to occur within the Owens River Valley ecoregion subarea are shown on Figure III.7-20 and detailed in Table III.7-40.

Table III.7-40
Focus Species Occurring within the Owens River Valley Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Amphibians/Reptiles			
Agassiz's desert tortoise	*Gopherus agassizii*	FT	ST
Birds			
Burrowing owl	*Athene cunicularia*	BCC/BLM	CSC
Golden eagle	*Aquila chrysaetos*	BLM	FP
Least Bell's vireo	*Vireo bellii pusillus*	FE/BCC	SE
Swainson's hawk	*Buteo swainsoni*	BLM/FS	ST
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	FT/FS/BCC/BLM	SE
Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus*)	Southwestern: FE	SE
Fish			
Owens pupfish	*Cyprinodon radiosus*	FE	SE/FP
Owens tui chub	*Siphateles (Gila) bicolor snyderi*	FE	SE
Mammals			
Mohave ground squirrel	*Xerospermophilus mohavensis*	BLM	ST
Pallid bat	*Antrozous pallidus*	BLM/FS	CSC
Townsend's big-eared bat	*Corynorhinus townsendii*	BLM/FS	SC/CSC
BLM Special-Status Plants			
Mojave tarplant	*Deinandra mohavensis*	BLM	SE (CRPR 1B.3)
Owens Valley checkerbloom	*Sidalcea covillei*	BLM	SE/ (CRPR 1B.1)

[1] Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern.

[2] State Status – SE: California Endangered; ST: California Threatened; SC: Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; SR: State Rare. California Rare Plant Rank (CRPR, formerly known as the CNPS List)– CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere; CRPR 3: Plants which need more information; CRPR 4: Limited distribution – a Watch List.

Panamint Death Valley Ecoregion Subarea

The Focus Species known to occur within the Panamint Death Valley ecoregion subarea are shown on Figure III.7-21 and detailed in Table III.7-41.

Table III.7-41
Focus Species Occurring within the Panamint Death Valley Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Amphibians/Reptiles			
Agassiz's desert tortoise	*Gopherus agassizii*	FT	ST
Birds			
Burrowing owl	*Athene cunicularia*	BCC/BLM	CSC
Golden eagle	*Aquila chrysaetos*	BLM	FP
Tricolored blackbird	*Agelaius tricolor*	BLM/BCC	SE
Mammals			
Desert bighorn sheep	*Ovis canadensis nelsoni*	Desert: BLM	Desert: FP[3]
California leaf-nosed bat	*Macrotus californicus*	BLM/FS	CSC
Mohave ground squirrel	*Xerospermophilus mohavensis*	BLM	ST
Pallid bat	*Antrozous pallidus*	BLM/FS	CSC
Townsend's big-eared bat	*Corynorhinus townsendii*	BLM/FS	SC/CSC

1 Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern.

2 State Status – SE: California Endangered; ST: California Threatened; SC: Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; SR: State Rare. California Rare Plant Rank (CRPR, formerly known as the CNPS List)– CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere; CRPR 3: Plants which need more information; CRPR 4: Limited distribution – a Watch List.

3 Limited hunting allowed.

Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

The Focus Species known to occur within the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea are shown on Figure III.7-22 and detailed in Table III.7-42.

Table III.7-42
Focus Species Occurring within the Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Amphibians/Reptiles			
Desert tortoise	*Gopherus agassizii*	FT	ST
Mojave fringe-toed lizard	*Uma scoparia*	BLM	CSC
Birds			
Bendire's thrasher	*Toxostoma bendirei*	BCC/BLM	CSC
Burrowing owl	*Athene cunicularia*	BCC/BLM	CSC
Golden eagle	*Aquila chrysaetos*	BLM	FP
Least Bell's vireo	*Vireo bellii pusillus*	FE/BCC	SE

Table III.7-42
Focus Species Occurring within the Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus*)	Southwestern: FE	SE
Fish			
Mohave tui chub	*Siphateles (Gila) bicolor mohavensis*	FE	SE/FP
Mammals			
Desert bighorn sheep	*Ovis canadensis nelsoni*	Desert: BLM	Desert: FP[3]
California leaf-nosed bat	*Macrotus californicus*	BLM/FS	CSC
Pallid bat	*Antrozous pallidus*	BLM/FS	CSC
Townsend's big-eared bat	*Corynorhinus townsendii*	BLM/FS	SC/CSC
Plants			
Alkali mariposa-lily	*Calochortus striatus*	BLM	(CRPR 1B.2)
Barstow woolly sunflower	*Eriophyllum mohavense*	BLM	(CRPR 1B.2)
Desert cymopterus	*Cymopterus deserticola*	BLM	(CRPR 1B.2)
Little San Bernardino Mountains linanthus	*Linanthus maculatus*	BLM	(CRPR 1B.2)
Mojave monkeyflower	*Mimulus mohavensis*	BLM	(CRPR 1B.2)
Parish's daisy	*Erigeron parishii*	FT	(CRPR 1B.1)
Triple-ribbed milk-vetch	*Astragalus tricarinatus*	FE	(CRPR 1B.2)

1 Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern.

2 State Status – SE: California Endangered; ST: California Threatened; SC: Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; SR: State Rare. California Rare Plant Rank (CRPR, formerly known as the CNPS List)– CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere; CRPR 3: Plants which need more information; CRPR 4: Limited distribution – a Watch List.

3 Limited hunting allowed.

Piute Valley and Sacramento Mountains Ecoregion Subarea

The Focus Species known to occur within the Piute Valley and Sacramento Mountains ecoregion subarea are shown on Figure III.7-23 and detailed in Table III.7-43.

Table III.7-43
Focus Species Occurring within the Piute Valley and Sacramento Mountains Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Federal Status[1]	StateStatus[2]
Amphibians/Reptiles			
Agassiz's desert tortoise	*Gopherus agassizii*	FT	ST
Birds			
Bendire's thrasher	*Toxostoma bendirei*	BCC/BLM	CSC
Burrowing owl	*Athene cunicularia*	BCC/BLM	CSC
Gila woodpecker	*Melanerpes uropygialis*	BLM/BCC	SE
Golden eagle	*Aquila chrysaetos*	BLM	FP
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	FT/FS/BCC/BLM	SE
Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus*)	Southwestern: FE	SE
Yuma Ridgway's rail	*Rallus obsoletus yumanensis*	FE/BCC	ST/FP
Mammals			
Desert bighorn sheep	*Ovis canadensis nelsoni*	Desert: BLM	Desert: FP[3]
California leaf-nosed bat	*Macrotus californicus*	BLM/FS	CSC
Pallid bat	*Antrozous pallidus*	BLM/FS	CSC
Townsend's big-eared bat	*Corynorhinus townsendii*	BLM/FS	SC/CSC

1 Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern.

2 State Status – SE: California Endangered; ST: California Threatened; SC: Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; SR: State Rare. California Rare Plant Rank (CRPR, formerly known as the CNPS List)– CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere; CRPR 3: Plants which need more information; CRPR 4: Limited distribution – a Watch List.

3 Limited hunting allowed.

Providence and Bullion Mountains Ecoregion Subarea

The Focus Species known to occur within the Providence and Bullion Mountains ecoregion subarea are shown on Figure III.7-24 and detailed in Table III.7-44.

Table III.7-44
Focus Species Occurring within the Providence and Bullion Mountains Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Amphibians/Reptiles			
Agassiz's desert tortoise	*Gopherus agassizii*	FT	ST
Mojave fringe-toed lizard	*Uma scoparia*	BLM	CSC

Table III.7-44
Focus Species Occurring within the Providence and Bullion Mountains Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Birds			
Bendire's thrasher	*Toxostoma bendirei*	BCC/BLM	CSC
Burrowing owl	*Athene cunicularia*	BCC/BLM	CSC
Golden eagle	*Aquila chrysaetos*	BLM	FP
Mountain plover	*Charadrius montanus*	BCC/BLM	CSC
Swainson's hawk	*Buteo swainsoni*	BLM/FS	ST
Fish			
Mohave tui chub	*Siphateles (Gila) bicolor mohavensis*	FE	SE/FP
Mammals			
Desert bighorn sheep	*Ovis canadensis nelsoni*	Desert: BLM	Desert: FP[3]
California leaf-nosed bat	*Macrotus californicus*	BLM/FS	CSC
Pallid bat	*Antrozous pallidus*	BLM/FS	CSC
Townsend's big-eared bat	*Corynorhinus townsendii*	BLM/FS	SC/CSC

[1] Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern.

[2] State Status – SE: California Endangered; ST: California Threatened; SC: Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; SR: State Rare. California Rare Plant Rank (CRPR, formerly known as the CNPS List)– CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere; CRPR 3: Plants which need more information; CRPR 4: Limited distribution – a Watch List.

[3] Limited hunting allowed.

West Mojave and Eastern Slopes Ecoregion Subarea

The Focus Species known to occur within the West Mojave and Eastern Slopes ecoregion subarea are shown on Figure III.7-25 and detailed in Table III.7-45.

Table III.7-45
Focus Species Occurring within the West Mojave and Eastern Slopes Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Amphibians/Reptiles			
Agassiz's desert tortoise	*Gopherus agassizii*	FT	ST
Mojave fringe-toed lizard	*Uma scoparia*	BLM	CSC
Tehachapi slender salamander	*Batrachoseps stebbinsi*	BLM/FS	ST
Birds			
Bendire's thrasher	*Toxostoma bendirei*	BCC/BLM	CSC
Burrowing owl	*Athene cunicularia*	BCC/BLM	CSC

Table III.7-45
Focus Species Occurring within the
West Mojave and Eastern Slopes Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Golden eagle	*Aquila chrysaetos*	BLM	FP
Greater sandhill crane	*Grus canadensis tabida*	BLM/FS	ST/FP
Least Bell's vireo	*Vireo bellii pusillus*	FE/BCC	SE
Mountain plover	*Charadrius montanus*	BCC/BLM	CSC
Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus*)	Southwestern: FE	SE
Swainson's hawk	*Buteo swainsoni*	BLM/FS	ST
Tricolored blackbird	*Agelaius tricolor*	BLM/BCC	SE
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	FT/FS/BCC/ BLM	SE
Yuma Ridgway's rail	*Rallus obsoletus yumanensis*	FE/BCC	ST/FP
Fish			
Mohave tui chub	*Siphateles (Gila) bicolor mohavensis*	FE	SE/FP
Mammals			
Mohave ground squirrel	*Xerospermophilus mohavensis*	BLM	ST
Pallid bat	*Antrozous pallidus*	BLM/FS	CSC
Townsend's big-eared bat	*Corynorhinus townsendii*	BLM/FS	SC/CSC
Plants			
Alkali mariposa-lily	*Calochortus striatus*	BLM	(CRPR 1B.2)
Bakersfield cactus	*Opuntia basilaris* var. *treleasei*	FE	SE/(CRPR 1B.1)
Barstow woolly sunflower	*Eriophyllum mohavense*	BLM	(CRPR 1B.2)
Desert cymopterus	*Cymopterus deserticola*	BLM	(CRPR 1B.2)
Mojave monkeyflower	*Mimulus mohavensis*	BLM	(CRPR 1B.2)
Mojave tarplant	*Deinandra mohavensis*	BLM	SE/(CRPR 1B.3)

[1] Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern.

[2] State Status – SE: California Endangered; ST: California Threatened; SC: Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; SR: State Rare. California Rare Plant Rank (CRPR, formerly known as the CNPS List)– CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere; CRPR 3: Plants which need more information; CRPR 4: Limited distribution – a Watch List.

III.7.6.2 Focus and Planning Species Modeled Habitat

Table III.7-46 shows the acreage of modeled habitat for each of the 37 Focus Species and 2 Planning Species. It also shows the acreage of and USFWS-designated critical habitat for the five Focus Species that have critical habitat designated in the DRECP Plan Area: Agassiz's desert tortoise, California condor, southwestern willow flycatcher, desert

pupfish, and Parish's daisy. There is also USFWS-designated critical habitat for three species not covered under DRECP in the DRECP Plan Area including 1,078 acres for Cushenbury milk-vetch (*Astragalus albens*), 118 acres for Cushenbury oxytheca (*Acanthoscyphus parishii* var. *goodmaniana*), and 12,105 acres for Peirson's milk-vetch (*Astragalus magdalenae* var. *peirsonii*). The species model methods and results are provided in Appendix C (Species Habitat Models) of the Baseline Biology Report (Appendix Q), and supporting documentation for species models with detailed information on methods, data, and processing is provided at http://databasin.org/.

Table III.7-46
Focus and Planning Species' Modeled Habitat and Critical Habitat within the DRECP Plan Area

Common Name	Scientific Name	Modeled Habitat (Acres)	Critical Habitat (Acres)
Focus Species			
Amphibians/Reptiles			
Agassiz's desert tortoise	*Gopherus agassizii*	12,305,800	4,143,000
Flat-tailed horned lizard	*Phrynosoma mcallii*	918,000	NA
Mojave fringe-toed lizard	*Uma scoparia*	1,122,000	NA
Tehachapi slender salamander	*Batrachoseps stebbinsi*	48,000	NA
Birds			
Bendire's thrasher	*Toxostoma bendirei*	2,219,000	NA
Burrowing owl	*Athene cunicularia*	6,496,000	NA
California black rail	*Laterallus jamaicensis coturniculus*	222,000	NA
California condor	*Gymnogyps californianus*	1,287,000	<10
Gila woodpecker	*Melanerpes uropygialis*	109,000	NA
Golden eagle – foraging	*Aquila chrysaetos*	8,082,000	NA
Golden eagle – nesting	*Aquila chrysaetos*	5,222,000	NA
Greater sandhill crane	*Grus canadensis tabida*	638,000	NA
Least Bell's vireo	*Vireo bellii pusillus*	233,000	NA
Mountain plover	*Charadrius montanus*	831,000	NA
Swainson's hawk	*Buteo swainsoni*	1,616,000	NA
Tricolored blackbird	*Agelaius tricolor*	278,000	NA
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	175,000	NA
Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus*)	330,000	5,600
Yuma Ridgway's rail	*Rallus obsoletus yumanensis*	58,000	NA

Table III.7-46
Focus and Planning Species' Modeled Habitat and Critical Habitat within the DRECP Plan Area

Common Name	Scientific Name	Modeled Habitat (Acres)	Critical Habitat (Acres)
	Fish		
Desert pupfish	*Cyprinodon macularius*	8,000	770
Mohave tui chub	*Siphateles (Gila) bicolor mohavensis*	400	NA
Owens pupfish	*Cyprinodon radiosus*	18,000	NA
Owens tui chub	*Siphateles (Gila) bicolor snyderi*	17,000	NA
	Mammals		
Desert bighorn sheep	*Ovis canadensis nelsoni*	Intermountain: 4,893,00; Mountain: 7,980,000	NA
California leaf-nosed bat	*Macrotus californicus*	8,319,000	NA
Mohave ground squirrel	*Xerospermophilus mohavensis*	3,501,000	NA
Pallid bat	*Antrozous pallidus*	19,649,000	NA
Townsend's big-eared bat	*Corynorhinus townsendii*	17,452,000	NA
	Plants		
Alkali mariposa-lily	*Calochortus striatus*	189,000	NA
Bakersfield cactus	*Opuntia basilaris* var. *treleasei*	279,000	NA
Barstow woolly sunflower	*Eriophyllum mohavense*	187,000	NA
Desert cymopterus	*Cymopterus deserticola*	345,000	NA
Little San Bernardino Mountains linanthus	*Linanthus maculatus*	345,000	NA
Mojave monkeyflower	*Mimulus mohavensis*	176,000	NA
Mojave tarplant	*Deinandra mohavensis*	270,000	NA
Owens Valley checkerbloom	*Sidalcea covillei*	148,000	NA
Parish's daisy	*Erigeron parishii*	188,000	1,600
Triple-ribbed milk-vetch	*Astragalus tricarinatus*	8,000	NA
	Planning Species		
	Mammals		
Burro deer	*Odocoileus hemionus eremicus*	1,151,000	NA
Desert kit fox	*Vulpes macrotis arsipus*	13,942,000	NA

Note: Critical habitat is USFWS-designated and the acreage includes areas on military and Open OHV lands; NA = Not applicable (no USFWS-designated critical habitat for this species occurs in the DRECP Plan Area).

Cadiz Valley and Chocolate Mountains Ecoregion Subarea

The Focus and Planning Species' modeled habitat within the Cadiz Valley and Chocolate Mountains ecoregion subarea are detailed in Table III.7-47. Maps of the Focus and Planning Species' modeled habitat are provided in the Baseline Biology Report.

Table III.7-47
Focus and Planning Species' Modeled Habitat within the Cadiz Valley and Chocolate Mountains Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Acres
Focus Species		
Amphibians/Reptiles		
Agassiz's desert tortoise	*Gopherus agassizii*	1,604,900
Flat-tailed horned lizard	*Phrynosoma mcallii*	2,000
Mojave fringe-toed lizard	*Uma scoparia*	589,000
Birds		
Bendire's thrasher	*Toxostoma bendirei*	65,000
Burrowing owl	*Athene cunicularia*	475,000
California black rail	*Laterallus jamaicensis coturniculus*	42,000
Gila woodpecker	*Melanerpes uropygialis*	27,000
Golden eagle – foraging	*Aquila chrysaetos*	1,283,000
Golden eagle – nesting	*Aquila chrysaetos*	646,000
Greater sandhill crane	*Grus canadensis tabida*	108,000
Least Bell's vireo	*Vireo bellii pusillus*	6,000
Mountain plover	*Charadrius montanus*	113,000
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	40,000
Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus*)	18,000
Yuma Ridgway's rail	*Rallus obsoletus yumanensis*	18,000
Fish		
Desert pupfish	*Cyprinodon macularius*	200
Mammals		
Desert bighorn sheep	*Ovis canadensis nelsoni*	Intermountain: 621,000; Mountain: 1,106,000
California leaf-nosed bat	*Macrotus californicus*	1,749,000
Pallid bat	*Antrozous pallidus*	2,768,000
Townsend's big-eared bat	*Corynorhinus townsendii*	2,202,000

Table III.7-47
Focus and Planning Species' Modeled Habitat within the Cadiz Valley and Chocolate Mountains Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Acres
Planning Species		
Mammals		
Burro deer	*Odocoileus hemionus eremicus*	809,000
Desert kit fox	*Vulpes macrotis arsipus*	1,971,000

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Imperial Borrego Valley Ecoregion Subarea

The Focus and Planning Species' modeled habitat within the Imperial Borrego Valley ecoregion subarea are detailed in Table III.7-48. Maps of the Focus and Planning Species' modeled habitat are provided in the Baseline Biology Report (Appendix Q).

Table III.7-48
Focus and Planning Species' Modeled Habitat within the Imperial Borrego Valley Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Acres
Focus Species		
Amphibians/Reptiles		
Agassiz's desert tortoise	*Gopherus agassizii*	175,400
Flat-tailed horned lizard	*Phrynosoma mcallii*	916,000
Birds		
Bendire's thrasher	*Toxostoma bendirei*	92,000
Burrowing owl	*Athene cunicularia*	1,445,000
California black rail	*Laterallus jamaicensis coturniculus*	166,000
Gila woodpecker	*Melanerpes uropygialis*	79,000
Golden eagle – foraging	*Aquila chrysaetos*	279,000
Golden eagle – nesting	*Aquila chrysaetos*	98,000
Greater sandhill crane	*Grus canadensis tabida*	527,000
Least Bell's vireo	*Vireo bellii pusillus*	9,000
Mountain plover	*Charadrius montanus*	503,000
Swainson's hawk	*Buteo swainsoni*	346,000
Tricolored blackbird	*Agelaius tricolor*	7,000
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	12,000

Table III.7-48
Focus and Planning Species' Modeled Habitat within the Imperial Borrego Valley Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Acres
Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus*)	143,000
Yuma Ridgway's rail	*Rallus obsoletus yumanensis*	30,000
Fish		
Desert pupfish	*Cyprinodon macularius*	8,000
Mammals		
Desert bighorn sheep	*Ovis canadensis nelsoni*	Intermountain: 30,000; Mountain: 243,000
California leaf-nosed bat	*Macrotus californicus*	834,000
Pallid bat	*Antrozous pallidus*	1,390,000
Townsend's big-eared bat	*Corynorhinus townsendii*	1,343,000
Plants		
Little San Bernardino Mountains linanthus	*Linanthus maculatus*	5,000
Planning Species		
Mammals		
Burro deer	*Odocoileus hemionus eremicus*	212,000
Desert kit fox	*Vulpes macrotis arsipus*	1,273,000

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Kingston and Funeral Mountains Ecoregion Subarea

The Focus and Planning Species' modeled habitat within the Kingston and Funeral Mountains ecoregion subarea are detailed in Table III.7-49. Maps of the Focus and Planning Species' modeled habitat are provided in the Baseline Biology Report (Appendix Q).

Table III.7-49
Focus and Planning Species' Modeled Habitat within the Kingston and Funeral Mountains Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Acres
Focus Species		
Amphibians/Reptiles		
Agassiz's desert tortoise	*Gopherus agassizii*	1,552,000
Mojave fringe-toed lizard	*Uma scoparia*	17,000
Birds		
Bendire's thrasher	*Toxostoma bendirei*	491,000
Burrowing owl	*Athene cunicularia*	123,000
Golden eagle - foraging	*Aquila chrysaetos*	1,186,000
Golden eagle - nesting	*Aquila chrysaetos*	852,000
Least Bell's vireo	*Vireo bellii pusillus*	50,000
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	5,000
Fish		
Mohave tui chub	*Siphateles (Gila) bicolor mohavensis*	70
Mammals		
Desert bighorn sheep	*Ovis canadensis nelsoni*	Intermountain: 475,000; Mountain: 1,386,000
California leaf-nosed bat	*Macrotus californicus*	1,063,000
Pallid bat	*Antrozous pallidus*	2,369,000
Townsend's big-eared bat	*Corynorhinus townsendii*	2,215,000
Planning Species		
Mammals		
Desert kit fox	*Vulpes macrotis arsipus*	1,557,000

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Mojave and Silurian Valley Ecoregion Subarea

The Focus and Planning Species' modeled habitat within the Mojave and Silurian Valley ecoregion subarea are detailed in Table III.7-50. Maps of the Focus and Planning Species' modeled habitat are provided in the Baseline Biology Report (Appendix Q).

Table III.7-50
Focus and Planning Species' Modeled Habitat within the Mojave and Silurian Valley Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Acres
Focus Species		
Amphibians/Reptiles		
Agassiz's desert tortoise	*Gopherus agassizii*	2,006,000
Mojave fringe-toed lizard	*Uma scoparia*	222,000
Birds		
Bendire's thrasher	*Toxostoma bendirei*	66,000
Burrowing owl	*Athene cunicularia*	510,000
Golden eagle – foraging	*Aquila chrysaetos*	1,236,000
Golden eagle – nesting	*Aquila chrysaetos*	545,000
Least Bell's vireo	*Vireo bellii pusillus*	12,000
Swainson's hawk	*Buteo swainsoni*	100
Tricolored blackbird	*Agelaius tricolor*	14,000
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	16,000
Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus*)	30
Fish		
Mohave tui chub	*Siphateles (Gila) bicolor mohavensis*	100
Mammals		
Desert bighorn sheep	*Ovis canadensis nelsoni*	Intermountain: 1,310,000; Mountain: 735,000
California leaf-nosed bat	*Macrotus californicus*	1,832,000
Mohave ground squirrel	*Xerospermophilus mohavensis*	733,000
Pallid bat	*Antrozous pallidus*	2,438,000
Townsend's big-eared bat	*Corynorhinus townsendii*	2,185,000
Plants		
Barstow woolly sunflower	*Eriophyllum mohavense*	80
Desert cymopterus	*Cymopterus deserticola*	300
Mojave monkeyflower	*Mimulus mohavensis*	20,000
Planning Species		
Mammals		
Desert kit fox	*Vulpes macrotis arsipus*	1,938,000

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Owens River Valley Ecoregion Subarea

The Focus and Planning Species' modeled habitats within the Owens River Valley ecoregion subarea are detailed in Table III.7-51. Maps of the Focus and Planning Species' modeled habitat are provided in the Baseline Biology Report (Appendix Q).

Table III.7-51
Focus and Planning Species' Modeled Habitat within the Owens River Valley Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Acres
Focus Species		
Amphibians/Reptiles		
Agassiz's desert tortoise	*Gopherus agassizii*	79,500
Birds		
Bendire's thrasher	*Toxostoma bendirei*	700
Burrowing owl	*Athene cunicularia*	160,000
California condor	*Gymnogyps californianus*	6,000
Golden eagle – foraging	*Aquila chrysaetos*	218,000
Golden eagle – nesting	*Aquila chrysaetos*	23,000
Least Bell's vireo	*Vireo bellii pusillus*	16,000
Swainson's hawk	*Buteo swainsoni*	222,000
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	58,000
Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus*)	72,000
Fish		
Owens pupfish	*Cyprinodon radiosus*	18,000
Owens tui chub	*Siphateles (Gila) bicolor snyderi*	17,000
Mammals		
Desert bighorn sheep	*Ovis canadensis nelsoni*	Intermountain: 20,000; Mountain: 80,000
Mohave ground squirrel	*Xerospermophilus mohavensis*	243,000
Pallid bat	*Antrozous pallidus*	332,000
Townsend's big-eared bat	*Corynorhinus townsendii*	352,000
Plants		
Alkali mariposa-lily	*Calochortus striatus*	20
Mojave tarplant	*Deinandra mohavensis*	11,000
Owens Valley checkerbloom	*Sidalcea covillei*	147,000

Table III.7-51
Focus and Planning Species' Modeled Habitat within the Owens River Valley Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Acres
Planning Species		
Mammals		
Desert kit fox	*Vulpes macrotis arsipus*	89,000

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Panamint Death Valley Ecoregion Subarea

The Focus and Planning Species' modeled habitats within the Panamint Death Valley ecoregion subarea are detailed in Table III.7-52. Maps of the Focus and Planning Species' modeled habitat are provided in the Baseline Biology Report (Appendix Q).

Table III.7-52
Focus and Planning Species' Modeled Habitat within the Panamint Death Valley Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Acres
Focus Species		
Amphibians/Reptiles		
Agassiz's desert tortoise	*Gopherus agassizii*	612,900
Mojave fringe-toed lizard	*Uma scoparia*	7,000
Birds		
Bendire's thrasher	*Toxostoma bendirei*	100
Burrowing owl	*Athene cunicularia*	134,000
California condor	*Gymnogyps californianus*	4,000
Golden eagle – foraging	*Aquila chrysaetos*	730,000
Golden eagle – nesting	*Aquila chrysaetos*	588,000
Least Bell's vireo	*Vireo bellii pusillus*	900
Swainson's hawk	*Buteo swainsoni*	90
Tricolored blackbird	*Agelaius tricolor*	70
Mammals		
Desert bighorn sheep	*Ovis canadensis nelsoni*	Intermountain: 843,000; Mountain: 994,000

Table III.7-52
Focus and Planning Species' Modeled Habitat within the Panamint Death Valley Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Acres
California leaf-nosed bat	*Macrotus californicus*	1,000
Mohave ground squirrel	*Xerospermophilus mohavensis*	27,9000
Pallid bat	*Antrozous pallidus*	1,674,000
Townsend's big-eared bat	*Corynorhinus townsendii*	1,597,000
Plants		
Mojave monkeyflower	*Mimulus mohavensis*	2,000
Planning Species		
Mammals		
Desert kit fox	*Vulpes macrotis arsipus*	863,000

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

The Focus and Planning Species' modeled habitats within the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea are detailed in Table III.7-53. Maps of the Focus and Planning Species' modeled habitat are provided in the Baseline Biology Report (Appendix Q).

Table III.7-53
Focus and Planning Species' Modeled Habitat within the Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Acres
Focus Species		
Amphibians/Reptiles		
Agassiz's desert tortoise	*Gopherus agassizii*	1,541,800
Mojave fringe-toed lizard	*Uma scoparia*	64,000
Birds		
Bendire's thrasher	*Toxostoma bendirei*	491,000
Burrowing owl	*Athene cunicularia*	789,000
California condor	*Gymnogyps californianus*	2,000
Golden eagle – foraging	*Aquila chrysaetos*	684,000
Golden eagle – nesting	*Aquila chrysaetos*	877,000
Least Bell's vireo	*Vireo bellii pusillus*	59,000
Swainson's hawk	*Buteo swainsoni*	300

Table III.7-53
Focus and Planning Species' Modeled Habitat within the Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Acres
Tricolored blackbird	*Agelaius tricolor*	18,000
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	2,000
Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus*)	10,000
Mammals		
Desert bighorn sheep	*Ovis canadensis nelsoni*	Intermountain: 518,000; Mountain: 1,408,000
California leaf-nosed bat	*Macrotus californicus*	506,000
Mohave ground squirrel	*Xerospermophilus mohavensis*	70,000
Pallid bat	*Antrozous pallidus*	2,184,000
Townsend's big-eared bat	*Corynorhinus townsendii*	2,105,000
Plants		
Alkali mariposa-lily	*Calochortus striatus*	4,000
Little San Bernardino Mountains linanthus	*Linanthus maculatus*	340,000
Mojave monkeyflower	*Mimulus mohavensis*	128,000
Mojave tarplant	*Deinandra mohavensis*	1,000
Parish's daisy	*Erigeron parishii*	188,000
Triple-ribbed milk-vetch	*Astragalus tricarinatus*	8,000
Planning Species		
Mammals		
Burro deer	*Odocoileus hemionus eremicus*	109,000
Desert kit fox	*Vulpes macrotis arsipus*	1,259,000

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Piute Valley and Sacramento Mountains Ecoregion Subarea

The Focus and Planning Species' modeled habitats within the Piute Valley and Sacramento Mountains ecoregion subarea are detailed in Table III.7-54. Maps of the Focus and Planning Species' modeled habitat are provided in the Baseline Biology Report (Appendix Q).

Table III.7-54
Focus and Planning Species' Modeled Habitat within the Piute Valley and Sacramento Mountains Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Acres
Focus Species		
Amphibians/Reptiles		
Agassiz's desert tortoise	*Gopherus agassizii*	815,300
Mojave fringe-toed lizard	*Uma scoparia*	200
Birds		
Bendire's thrasher	*Toxostoma bendirei*	138,000
Burrowing owl	*Athene cunicularia*	13,000
California black rail	*Laterallus jamaicensis coturniculus*	14,000
Gila woodpecker	*Melanerpes uropygialis*	2,000
Golden eagle – foraging	*Aquila chrysaetos*	492,000
Golden eagle – nesting	*Aquila chrysaetos*	354,000
Greater sandhill crane	*Grus canadensis tabida*	4,000
Least Bell's vireo	*Vireo bellii pusillus*	7,000
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	19,000
Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus*)	5,000
Yuma Ridgway's rail	*Rallus obsoletus yumanensis*	10,000
Mammals		
Desert bighorn sheep	*Ovis canadensis nelsoni*	Intermountain: 128,000; Mountain: 589,000
California leaf-nosed bat	*Macrotus californicus*	470,000
Pallid bat	*Antrozous pallidus*	1,076,000
Townsend's big-eared bat	*Corynorhinus townsendii*	522,000
Planning Species		
Mammals		
Burro deer	*Odocoileus hemionus eremicus*	18,000
Desert kit fox	*Vulpes macrotis arsipus*	649,000

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Providence and Bullion Mountains Ecoregion Subarea

The Focus and Planning Species' modeled habitats within the Providence and Bullion Mountains ecoregion subarea are detailed in Table III.7-55. Maps of the Focus and Planning Species' modeled habitat are provided in the Baseline Biology Report (Appendix Q).

Table III.7-55
Focus and Planning Species' Modeled Habitat within the Providence and Bullion Mountains Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Acres
Focus Species		
Amphibians/Reptiles		
Agassiz's desert tortoise	*Gopherus agassizii*	1,773,000
Mojave fringe-toed lizard	*Uma scoparia*	218,000
Birds		
Bendire's thrasher	*Toxostoma bendirei*	742,000
Burrowing owl	*Athene cunicularia*	212,000
Golden eagle – foraging	*Aquila chrysaetos*	1,099,000
Golden eagle – nesting	*Aquila chrysaetos*	732,000
Greater sandhill crane	*Grus canadensis tabida*	<10
Least Bell's vireo	*Vireo bellii pusillus*	16,000
Tricolored blackbird	*Agelaius tricolor*	100
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	3,000
Mammals		
Desert bighorn sheep	*Ovis canadensis nelsoni*	Intermountain: 541,000; Mountain: 1,310,000
California leaf-nosed bat	*Macrotus californicus*	1,862,000
Pallid bat	*Antrozous pallidus*	2,543,000
Townsend's big-eared bat	*Corynorhinus townsendii*	2,291,000
Plants		
Mojave monkeyflower	*Mimulus mohavensis*	<10
Planning Species		
Mammals		
Burro deer	*Odocoileus hemionus eremicus*	2,000
Desert kit fox	*Vulpes macrotis arsipus*	1,811,000

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

West Mojave and Eastern Slopes Ecoregion Subarea

The Focus and Planning Species' modeled habitats within the West Mojave and Eastern Slopes ecoregion subarea are detailed in Table III.7-56. Maps of the Focus and Planning Species' modeled habitat are provided in the Baseline Biology Report (Appendix Q).

Table III.7-56
Focus and Planning Species' Modeled Habitat within the West Mojave and Eastern Slopes Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Acres
Focus Species		
Amphibians/Reptiles		
Agassiz's desert tortoise	*Gopherus agassizii*	2,145,000
Mojave fringe-toed lizard	*Uma scoparia*	6,000
Tehachapi slender salamander	*Batrachoseps stebbinsi*	48,000
Birds		
Bendire's thrasher	*Toxostoma bendirei*	133,000
Burrowing owl	*Athene cunicularia*	2,636,000
California condor	*Gymnogyps californianus*	1,276,000
Golden eagle - foraging	*Aquila chrysaetos*	875,000
Golden eagle - nesting	*Aquila chrysaetos*	508,000
Least Bell's vireo	*Vireo bellii pusillus*	58,000
Mountain plover	*Charadrius montanus*	215,000
Swainson's hawk	*Buteo swainsoni*	1,046,000
Tricolored blackbird	*Agelaius tricolor*	239,000
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	20,000
Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus*)	83,000
Yuma Ridgway's rail	*Rallus obsoletus yumanensis*	70
Fish		
Mohave tui chub	*Siphateles (Gila) bicolor mohavensis*	100
Mammals		
Desert bighorn sheep	*Ovis canadensis nelsoni*	Intermountain: 407,000; Mountain: 123,000
California leaf-nosed bat	*Macrotus californicus*	3,000
Mohave ground squirrel	*Xerospermophilus mohavensis*	2,176,000
Pallid bat	*Antrozous pallidus*	2,875,000
Townsend's big-eared bat	*Corynorhinus townsendii*	2,639,000

Table III.7-56
Focus and Planning Species' Modeled Habitat within the West Mojave and Eastern Slopes Ecoregion Subarea of the DRECP

Common Name	Scientific Name	Acres
Plants		
Alkali mariposa-lily	*Calochortus striatus*	185,000
Bakersfield cactus	*Opuntia basilaris* var. *treleasei*	279,000
Barstow woolly sunflower	*Eriophyllum mohavense*	187,000
Desert cymopterus	*Cymopterus deserticola*	345,000
Mojave monkeyflower	*Mimulus mohavensis*	27,000
Mojave tarplant	*Deinandra mohavensis*	259,000
Owens Valley checkerbloom	*Sidalcea covillei*	1,000
Parish's daisy	*Erigeron parishii*	200
Planning Species		
Mammals		
Desert kit fox	*Vulpes macrotis arsipus*	2,532,000

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

III.7.6.3 Other Bureau of Land Management Special-Status Species Addressed in the Land Use Plan Amendment

Other BLM Special-Status Species not considered Focus or Planning Species are addressed in Section III.7.6.4.

III.7.6.4 Non-Focus BLM Special-Status Species in the Land Use Plan Amendment Decision Area

In addition to the Focus Species discussed above, hundreds of other special-status species were evaluated. The species included in Table III.7-57 are special-status species that are not considered Proposed LUPA Focus Species and are hereafter referred to as the "Non-Focus BLM Special-Status Species." Regionally special-status species presented in Table III.7-57 include those with significant occurrence or range overlap with the LUPA Decision Area and those designated as BLM Special-Status Species.

Federally and/or state-listed Non-Focus Species will continue to be regulated under the ESA and CESA (Section III.7.1). Take of listed species can be authorized separately from this Proposed LUPA under Section 7 or Section 10 of the federal ESA, and take exceptions under Section 2081 of the Fish and Game Code. Impacts to Non-Focus BLM Special-Status Species can also be addressed through the DRECP and Permit Amendment process described in

Volume II, Chapter II.3, Section II.3.3. In addition, most nesting native birds are afforded protection under the federal MBTA and California Fish and Game Code Section 3503.

In addition to the name and special-status ranking, Table III.7-57 identifies the vegetation types typically associated with each species' preferred habitat. These associated vegetation types were derived using the actual vegetation types mapped (as described in Section III.7.4 and identified on Figures III.7-3 through III.7-13) at the locations of the species' occurrences (CDFW 2013a), habitat requirements for the species as described in the Baseline Biology Report (Appendix Q), and the California Wildlife Habitat Relationships species' descriptions and range maps (Zeiner et al 1988–1990).

Table III.7-57
Non-Focus BLM Special-Status Species

Common Name	Scientific Name	Associated General Community Groupings and Vegetation Types/Land Covers[1]	Federal Status[2]	State Status[3]
		Invertebrates		
Amargosa springsnail	*Pyrgulopsis amargosae*	**Riparian and wetland communities** (springs)	BLM[4]	CSC
Shoshone Cave whip-scorpion	*Hubbardia shoshonensis*	Varied (subterranean)	BLM	None
		Amphibians/Reptiles		
Arroyo toad	*Anaxyrus (Bufo) californicus*	**Riparian and wetland communities**: Southwestern North American riparian, flooded and swamp forest/scrubland **Grassland communities**: California annual and perennial grassland **Scrub and chaparral communities**: Californian xeric chaparral, intermountain dry shrubland and grassland, lower bajada and fan Mojavean–Sonoran desert scrub **Dune/rocky, barren, and unvegetated communities**: North American warm desert dunes and sand flats **Forest/woodland communities**: Western Great Basin montane conifer woodland **Land covers**: Developed, rural	FE	CSC
Banded gila monster	*Heloderma suspectum cinctum*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop **Scrub and chaparral communities**: Intermountain dry shrubland and grassland, lower bajada and fan Mojavean–Sonoran desert scrub	BLM	CSC

Table III.7-57
Non-Focus BLM Special-Status Species

Common Name	Scientific Name	Associated General Community Groupings and Vegetation Types/Land Covers[1]	Federal Status[2]	State Status[3]
Barefoot gecko	*Coleonyx switaki*	**Dune/rocky, barren, and unvegetated communities**: North American warm semi-desert cliff, scree, and other rock	BLM	ST
Coast horned lizard	*Phrynosoma blainvillii*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop **Grassland communities**: California annual and perennial grassland **Forest/woodland communities**: Californian montane conifer forest, western Great Basin montane conifer woodland **Riparian/wetland communities**: Southwestern North American riparian, flooded and swamp forest/scrubland, southwestern North American riparian evergreen and deciduous woodland **Scrub and chaparral communities**: Californian xeric chaparral, central and south coastal Californian coastal sage scrub, intermountain dry shrubland and grassland, intermountain west mesic tall sagebrush shrubland and steppe, lower bajada and fan Mojavean–Sonoran desert scrub, shadscale–saltbush cool semi-desert scrub	BLM	CSC
Coachella fringe-toed lizard	*Uma inornata*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop	FE	SC
Colorado Desert fringe-toed lizard	*Uma notata*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert dunes and sand flats, North American warm desert bedrock cliff and outcrop (within sandy areas) **Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub (within sandy areas), Madrean warm semi-desert wash woodland/scrub (within sandy areas)	BLM	CSC
Couch's spadefoot	*Scaphiopus couchii*	**Riparian and wetland communities** **Scrub and chaparral communities**	BLM	CSC
Sierra Madre yellow-legged frog	*Rana muscosa*	**Riparian and wetland communities**	FE	SC, CSC
Western pond turtle	*Emys marmorata*	**Riparian and wetland communities**	BLM	CSC

Table III.7-57
Non-Focus BLM Special-Status Species

Common Name	Scientific Name	Associated General Community Groupings and Vegetation Types/Land Covers[1]	Federal Status[2]	State Status[3]
		Birds		
Arizona Bell's vireo	*Vireo bellii arizonae*	**Scrub and chaparral communities**: Arizonan upland Sonoran desert scrub, lower bajada and fan Mojavean–Sonoran desert scrub, Madrean warm semi-desert wash woodland/scrub **Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop **Riparian and wetland communities**: Open water, southwestern North American riparian, flooded and swamp forest/scrubland, southwestern North American introduced riparian scrub **Land cover:** Agriculture, rural	BLM	SE
Bald eagle	*Haliaeetus leucocephalus*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop, North American warm desert dunes and sand flats **Riparian and wetland communities**: Open water **Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub, Madrean warm semi-desert wash woodland/scrub **Land cover**: Rural	Eagle Act	SE
Bank swallow	*Riparia riparia*	**Dune/rocky, barren, and unvegetated communities**: Desert playa, North American warm desert bedrock cliff and outcrop, North American warm desert dunes and sand flats **Grassland communities**: Mediterranean California naturalized annual and perennial grassland **Riparian and wetland communities**: Arid West freshwater emergent marsh, Southwestern North American riparian, flooded and swamp forest/scrubland, western North American freshwater marsh, open water **Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub, shadscale–saltbush cool semi-desert scrub **Land cover**: Agriculture	BLM	ST

Table III.7-57
Non-Focus BLM Special-Status Species

Common Name	Scientific Name	Associated General Community Groupings and Vegetation Types/Land Covers[1]	Federal Status[2]	State Status[3]
Elf owl	*Micrathene whitneyi*	**Riparian and wetland communities**: Open water, southwestern North American riparian, flooded and swamp forest/scrubland, southwestern North American introduced riparian scrub **Scrub and chaparral communities**: Arizonan upland Sonoran desert scrub, lower bajada and fan Mojavean–Sonoran desert scrub, shadscale–saltbush cool semi-desert scrub **Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop **Land cover**: Agriculture, rural, developed	BLM, BCC	SE
Gilded flicker	*Colaptes chrysoides*	**Scrub and chaparral communities**: Arizonan upland Sonoran desert scrub, lower bajada and fan Mojavean–Sonoran desert scrub, Mojave and Great Basin upper bajada and toeslope (including Joshua tree woodland) **Riparian and wetland communities**: Southwestern North American riparian, flooded and swamp forest/scrubland, Sonoran–Coloradan semi-desert wash woodland/scrub	BLM, BCC	SE
Gray vireo	*Vireo vicinior*	**Forest/woodland communities**: Californian montane conifer forest, western Great Basin montane conifer woodland **Scrub and chaparral communities**: Californian xeric chaparral, intermountain dry shrubland and grassland, intermountain west mesic tall sagebrush shrubland and steppe, lower bajada and fan Mojavean–Sonoran desert scrub	BLM, BCC	CSC
Inyo California towhee	*Melozone* [=*Pipilo*] *crissalis eremophilus*	**Riparian and wetland communities**: Southwestern North American riparian, flooded and swamp forest/scrubland	FT, BLM*	SE
Le Conte's thrasher	*Toxostoma lecontei*	**Dune/rocky, barren, and unvegetated communities**: Desert playa, North American warm desert bedrock cliff and outcrop, North American warm desert dunes and sand flats **Scrub and chaparral communities**: Californian xeric chaparral, central and south coastal Californian coastal sage scrub, intermontane	BLM	CSC

Table III.7-57
Non-Focus BLM Special-Status Species

Common Name	Scientific Name	Associated General Community Groupings and Vegetation Types/Land Covers[1]	Federal Status[2]	State Status[3]
		deep or well-drained soil scrub, intermountain dry shrubland and grassland, intermountain west mesic tall sagebrush shrubland and steppe, lower bajada and fan Mojavean–Sonoran desert scrub, Madrean warm semi-desert wash woodland/scrub, Mojave and Great Basin upper bajada and toeslope, shadscale–saltbush cool semi-desert scrub		
Lucy's warbler	*Oreothlypis luciae*	**Riparian and wetland communities** **Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub	BLM BCC	CSC
Western snowy plover	*Charadrius alexandrinus nivosus*	**LUPA Decision Area outside DRECP Boundary**	FT	CSC
White-tailed kite	*Elanus leucurus*	**Grassland communities** **Riparian and wetland communities** **Land cover**: Agriculture	BLM	FP
		Fish		
Amargosa Canyon speckled dace	*Rhinichthys osculus* ssp. [1]	**Riparian and wetland communities**	BLM[4]	CSC
Amargosa pupfish	*Cyprinodon nevadensis amargosae*	**Riparian and wetland communities**	BLM[4]	CSC
		Mammals		
Amargosa vole	*Microtus californicus scirpensis*	**Grassland communities** **Riparian and wetland communities** **Dune/rocky, barren, and unvegetated communities**: Desert playa, North American warm desert bedrock cliff and outcrop	FE, BLM[4]	SE
Bighorn sheep (Peninsular Ranges distinct population segment [DPS])	*Ovis canadensis nelsoni*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop **Forest/woodland communities**: Western Great Basin montane conifer woodland **Scrub and chaparral communities**: Intermountain dry shrubland and grassland, lower bajada and fan Mojavean–Sonoran desert scrub, Madrean warm semi-desert wash woodland/ scrub	FE, BLM	ST, FP

Table III.7-57
Non-Focus BLM Special-Status Species

Common Name	Scientific Name	Associated General Community Groupings and Vegetation Types/Land Covers[1]	Federal Status[2]	State Status[3]
Cave myotis	*Myotis velifer*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop **Riparian and wetland communities** **Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub	BLM	CSC
Fringed myotis	*Myotis thysanodes*	**Forest/woodland communities** **Riparian and wetland communities** **Scrub and chaparral communities**: Avoids desert	BLM	None
Long-eared myotis	*Myotis evotis*	**Forest/woodland communities** **Riparian and wetland communities** **Scrub and chaparral communities**: Avoids desert	BLM	None
Nelson's bighorn sheep	*Ovis canadensis nelsoni*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop **Forest/woodland communities**: Western Great Basin montane conifer woodland **Scrub and chaparral communities**: Intermountain dry shrubland and grassland, lower bajada and fan Mojavean–Sonoran desert scrub, Madrean warm semi-desert wash woodland/ scrub	BLM	FP
Owen's valley vole	*Microtus californicus vallicola*	**Riparian and wetland communities**	BLM	CSC
Spotted bat	*Euderma maculatum*	**Dune/rocky, barren, and unvegetated communities**: Desert playa **Forest/woodland communities** **Grassland communities**: Mediterranean California naturalized annual and perennial grassland **Riparian and wetland communities**: Southwestern North American riparian, flooded and swamp forest/scrubland **Scrub and chaparral communities**: Intermountain dry shrubland and grassland, lower bajada and fan Mojavean–Sonoran desert scrub, shadscale–saltbush cool semi-desert scrub	BLM	CSC

Table III.7-57
Non-Focus BLM Special-Status Species

Common Name	Scientific Name	Associated General Community Groupings and Vegetation Types/Land Covers[1]	Federal Status[2]	State Status[3]
Western mastiff bat	*Eumops perotis californicus*	**Dune/rocky, barren, and unvegetated communities** **Forest/woodland communities** **Riparian and wetland communities** **Scrub and chaparral communities** **Land cover**: Rural	BLM	CSC
Yellow-eared pocket mouse	*Perognathus parvus xanthonotus*	**Scrub and chaparral communities**: Intermountain dry shrubland and grassland	BLM	None
Yuma myotis	*Myotis yumanensis*	**Dune/rocky, barren, and unvegetated communities**: Desert playa, North American warm desert bedrock cliff and outcrop **Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub	BLM	None
		Plants		
Algodones Dunes sunflower	*Helianthus niveus* ssp. *tephrodes*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert dunes and sand flats **Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub	BLM	SE
Amargosa beardtongue	*Penstemon fruticiformis* var. *amargosae*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop **Forest/woodland communities**: Pinyon–juniper woodland **Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub, intermountain dry shrubland and grassland	BLM	(CRPR 1B.3)
Amargosa nitrophila	*Nitrophila mohavensis*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop, desert playa	FE	SE (CRPR 1B.2)
Ash Meadows buckwheat	*Eriogonum contiguum*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 2.3)

Table III.7-57
Non-Focus BLM Special-Status Species

Common Name	Scientific Name	Associated General Community Groupings and Vegetation Types/Land Covers[1]	Federal Status[2]	State Status[3]
Ash Meadows gumplant	*Grindelia fraxinipratensis (=Grindelia fraxino-pratensis)*	**Dune/rocky, barren, and unvegetated communities**: Desert playa **Riparian and wetland communities**: Arid West freshwater emergent marsh **Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub, Sonoran–Coloradan semi-desert wash woodland/scrub	FT	(CRPR 1B.2)
Chaparral sand-verbena	*Abronia villosa* var. *aurita*	**Forest/woodland communities**: Californian–Vancouverian montane and foothill forest **Land cover:** Developed	BLM	(CRPR 1B.1)
Charlotte's phacelia	*Phacelia nashiana*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop **Forest/woodland communities**: Western Great Basin montane conifer woodland **Scrub and chaparral communities**: Central and south coastal Californian coastal sage scrub, intermountain dry shrubland and grassland, lower bajada and fan Mojavean–Sonoran desert scrub, Mojavean semi-desert wash scrub	BLM	(CRPR 1B.2)
Coachella Valley milk-vetch	*Astragalus lentiginosus* var. *coachellae*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop **Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub	FE	(CRPR 1B.2)
Creamy blazing star	*Mentzelia tridentata*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop **Forest/woodland communities**: Western Great Basin montane conifer woodland **Scrub and chaparral communities**: Intermountain dry shrubland and grassland, lower bajada and fan Mojavean–Sonoran desert scrub	BLM	(CRPR 1B.3)
Cushenbury buckwheat	*Eriogonum ovalifolium* var. *vineum*	**Forest/woodland communities:** Californian montane conifer forest, western Great Basin montane conifer woodland **Grassland communities:** California annual and perennial grassland **Scrub and chaparral communities:** Intermountain dry shrubland and grassland **Land cover:** Rural	FE	(CRPR 1B.1)

Table III.7-57
Non-Focus BLM Special-Status Species

Common Name	Scientific Name	Associated General Community Groupings and Vegetation Types/Land Covers[1]	Federal Status[2]	State Status[3]
Cushenbury milk-vetch	*Astragalus albens*	**Grassland communities**: California annual and perennial grassland **Scrub and chaparral communities**: Intermountain dry shrubland and grassland, Mojave and Great Basin upper bajada and toeslope **Forest/woodland communities**: Western Great Basin montane conifer woodland	FE	(CRPR 1B.1)
Cushenbury oxytheca	*Acanthoscyphus parishii* var. *goodmaniana*	**Grassland communities**: California annual and perennial grassland **Scrub and chaparral communities**: Intermountain dry shrubland and grassland, Mojave and Great Basin upper bajada and toeslope **Forest/woodland communities**: Western Great Basin montane conifer woodland, Californian montane conifer forest	FE	(CRPR 1B.1)
Death Valley sandpaper-plant	*Petalonyx thurberi* ssp. *gilmanii*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.2)
Dedecker's clover	*Trifolium dedeckerae*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.3)
Flat-seeded spurge	*Chamaesyce platysperma*	**Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub	BLM	(CRPR 1B.2)
Forked buckwheat	*Eriogonum bifurcatum*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop **Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub	BLM	(CRPR 1B.2)
Gilman's goldenbush	*Ericameria gilmanii*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.3)
Hall's daisy	*Erigeron aequifolius*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.3)
Harwood's eriastrum	*Eriastrum harwoodii*	**Dune/rocky, barren, and unvegetated communities**: Desert playa, North American warm desert dunes and sand flats **Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub, Madrean warm semi-desert wash woodland/scrub	BLM	(CRPR 1B.2)

Table III.7-57
Non-Focus BLM Special-Status Species

Common Name	Scientific Name	Associated General Community Groupings and Vegetation Types/Land Covers[1]	Federal Status[2]	State Status[3]
Hoffmann's buckwheat	*Eriogonum hoffmannii* var. *hoffmannii*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.3)
Inyo blazing star	*Mentzelia inyoensis*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.3)
Inyo County star-tulip	*Calochortus excavatus*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop **Riparian and wetland communities**: Arid West freshwater emergent marsh, southwestern North American riparian, flooded and swamp forest/scrubland, southwestern North American salt basin and high marsh **Scrub and chaparral communities**: Intermountain dry shrubland and grassland, intermountain west mesic tall sagebrush shrubland and steppe, shadscale–saltbush cool semi-desert scrub	BLM	(CRPR 1B.1)
Inyo rock daisy	*Perityle inyoensis*	**CDCA Area outside the DRECP Boundary**	BLM	(CRPR 1B.2)
Jacumba milk-vetch	*Astragalus douglasii* var. *perstrictus*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.2)
July gold	*Dedeckera eurekensis*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.3)
Kelso Creek monkeyflower	*Mimulus shevockii*	**Scrub and chaparral communities**: Intermountain dry shrubland and grassland, intermountain west mesic tall sagebrush shrubland and steppe	BLM	(CRPR 1B.2)
Kern buckwheat	*Eriogonum kennedyi* var. *pinicola*	**Forest/woodland communities**: Californian montane conifer forest, Western Great Basin montane conifer woodland **Scrub and chaparral communities**: Intermountain west mesic tall sagebrush shrubland and steppe	BLM	(CRPR 1B.1)
Kern River evening-primrose	*Camissonia integrifolia*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.3)

Table III.7-57
Non-Focus BLM Special-Status Species

Common Name	Scientific Name	Associated General Community Groupings and Vegetation Types/Land Covers[1]	Federal Status[2]	State Status[3]
Lane Mountain milk-vetch	*Astragalus jaegerianus*	**Dune/rocky, barren, and unvegetated communities:** North American warm desert bedrock cliff and outcrop **Scrub and chaparral communities:** Intermountain dry shrubland and grassland, lower bajada and fan Mojavean–Sonoran desert scrub, shadscale–saltbush cool semi-desert scrub	FE	(CRPR 1B.1)
Latimer's woodland-gilia	*Saltugilia latimeri*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.2)
Mountain Springs bush lupine	*Lupinus excubitus* var. *medius*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.3)
Muir's tarplant	*Carlquistia muirii*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.3)
Munz's cholla	*Cylindropuntia munzii*	**Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub	BLM	(CRPR 1B.3)
Nine Mile Canyon phacelia	*Phacelia novenmillensis*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.2)
Orcutt's linanthus	*Linanthus orcuttii*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.3)
Orcutt's woody-aster	*Xylorhiza orcuttii*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop **Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub	BLM	(CRPR 1B.2)
Orocopia sage	*Salvia greatae*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop **Scrub and chaparral communities**: Madrean warm semi-desert wash woodland/scrub, shadscale–saltbush cool semi-desert scrub	BLM	(CRPR 1B.3)
Owens Peak lomatium	*Lomatium shevockii*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.3)

Table III.7-57
Non-Focus BLM Special-Status Species

Common Name	Scientific Name	Associated General Community Groupings and Vegetation Types/Land Covers[1]	Federal Status[2]	State Status[3]
Pale-yellow layia	*Layia heterotricha*	**Scrub and chaparral communities**: Central and south coastal California coastal sage scrub; lower bajada and fan Mojavean–Sonoran desert scrub, intermountain dry shrubland and grassland; intermountain west mesic tall sagebrush **Forest/woodland communities**: Californian broadleaf forest and woodland **Land cover**: Developed	BLM	(CRPR 1B.1)
Palmer's mariposa-lily	*Calochortus palmeri* var. *palmeri*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.2)
Panamint daisy	*Enceliopsis covillei*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.2)
Panamint dudleya	*Dudleya saxosa* ssp. *saxosa*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.3)
Panamint Mountains buckwheat	*Eriogonum microthecum* var. *panamintense*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.3)
Panamint Mountains lupine	*Lupinus magnificus* var. *magnificus*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.2)
Parish's alkali grass	*Puccinellia parishii*	**Riparian and wetland communities:** Desert alkali springs and seeps **Land cover**: Rural	BLM	(CRPR 1B.1)
Parish's phacelia	*Phacelia parishii*	**Dune/rocky, barren, and unvegetated communities:** Desert playa, North American warm desert bedrock cliff and outcrop **Scrub and chaparral communities:** Lower bajada and fan Mojavean–Sonoran desert scrub, shadscale–saltbush cool semi-desert scrub **Land cover:** Developed	BLM	(CRPR 1B.1)
Parry's spineflower	*Chorizanthe parryi* var. *parryi*	**Land cover**: Developed	BLM	(CRPR 1B.1)

Table III.7-57
Non-Focus BLM Special-Status Species

Common Name	Scientific Name	Associated General Community Groupings and Vegetation Types/Land Covers[1]	Federal Status[2]	State Status[3]
Pierson's milk-vetch	*Astragalus magdalenae* var. *peirsonii*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert dunes and sand flats **Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub	FT	SE
Pinyon Mesa buckwheat	*Eriogonum mensicola*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.3)
Piute Mountains jewel-flower	*Streptanthus cordatus* var. *piutensis*	**Forest/woodland communities**: Californian montane conifer forest **Scrub and chaparral communities**: Intermountain west mesic tall sagebrush shrubland and steppe	BLM	(CRPR 1B.2)
Recurved larkspur	*Delphinium recurvatum*	**Grassland communities** **Scrub and chaparral communities** **Forest/woodland communities** **Land cover**: Developed	BLM	(CRPR 1B.2)
Red Rock poppy	*Eschscholzia minutiflora* ssp. *twisselmannii*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop **Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub, Mojavean semi-desert wash scrub, shadscale–saltbush cool semi-desert scrub	BLM	(CRPR 1B.2)
Red Rock tarplant	*Deinandra arida*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop **Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub, Mojavean semi-desert wash scrub, shadscale–saltbush cool semi-desert scrub	BLM	(CRPR 1B.2)
Robison's monardella	*Monardella robisonii*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop **Scrub and chaparral communities**: Intermountain dry shrubland and grassland, lower bajada and fan Mojavean–Sonoran desert scrub	BLM	(CRPR 1B.3)

Table III.7-57
Non-Focus BLM Special-Status Species

Common Name	Scientific Name	Associated General Community Groupings and Vegetation Types/Land Covers[1]	Federal Status[2]	State Status[3]
Rusby's desert-mallow	*Sphaeralcea rusbyi* var. *eremicola*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop **Scrub and chaparral communities**: Intermountain dry shrubland and grassland, lower bajada and fan Mojavean–Sonoran desert scrub, shadscale–saltbush cool semi-desert scrub	BLM	(CRPR 1B.2)
San Bernardino milk-vetch	*Astragalus bernardinus*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.2)
San Bernardino aster	*Symphyotrichum defoliatum*	**Forest/woodland communities**: Californian–Vancouverian montane and foothill forest	BLM	(CRPR 1B.2)
San Bernardino Mountains dudleya	*Dudleya abramsii* ssp. *affinis*	**Forest/woodland communities**: Western Great Basin montane conifer woodland	BLM	(CRPR 1B.2)
Sand food	*Pholisma sonorae*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert dunes and sand flats **Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub	BLM	(CRPR 1B.2)
San Diego button-celery	*Eryngium aristulatum* var. *parishii*	**CDCA Area outside DRECP Boundary**	FE	SE, (CRPR 1B.1)
Sanicle cymopterus	*Cymopterus ripleyi* var. *saniculoides*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.2)
Scrub lotus	*Acmispon argyraeus* var. *multicaulis*	**Dune/rocky, barren, and unvegetated communities**: North American warm semi-desert cliff, scree, and other rock vegetation **Scrub and chaparral communities**: Intermountain dry shrubland and grassland Mojavean–Sonoran desert scrub, Western North America tall sage shrubland and steppe **Forest/woodland communities**: Intermountain basins pinyon–juniper woodland	BLM	(CRPR 1B.3)

Table III.7-57
Non-Focus BLM Special-Status Species

Common Name	Scientific Name	Associated General Community Groupings and Vegetation Types/Land Covers[1]	Federal Status[2]	State Status[3]
Short-joint beavertail cactus	*Opuntia basilaris* var. *brachyclada*	**Grassland communities**: California annual and perennial grassland **Forest/woodland communities**: Californian broadleaf forest and woodland, Californian montane conifer forest, Western Great Basin montane conifer woodland **Scrub and chaparral communities**: Californian xeric chaparral, central and south coastal Californian coastal sage scrub, intermontane seral shrubland, intermountain dry shrubland and grassland **Land cover:** Agriculture	BLM	(CRPR 1B.2)
Southern jewel-flower	*Streptanthus campestris*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.3)
Spanish needle onion	*Allium shevockii*	**Forest/woodland communities**: Californian montane conifer forest, Western Great Basin montane conifer woodland **Scrub and chaparral communities**: Intermountain dry shrubland and grassland, intermountain west mesic tall sagebrush shrubland and steppe	BLM	(CRPR 1B.3)
Stephen's beardtongue	*Penstemon stephensii*	**Dune/rocky, barren, and unvegetated communities**: North American warm semi-desert cliff, scree, and other rock vegetation **Scrub and chaparral communities**: Intermountain dry shrubland and grassland, Mojavean–Sonoran desert scrub **Forest/woodland communities**: Intermountain basins pinyon–juniper woodland **Land cover**: Developed	BLM	(CRPR 1B.3)
Sweet-smelling monardella	*Monardella beneolens*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.3)
Thorne's buckwheat	*Eriogonum thornei*	**Scrub and chaparral communities**: Intermountain west mesic tall sagebrush shrubland and steppe **Dune/rocky, barren, and unvegetated communities**: North American warm desert bedrock cliff and outcrop	BLM	SE (CRPR 1B.2)

Table III.7-57
Non-Focus BLM Special-Status Species

Common Name	Scientific Name	Associated General Community Groupings and Vegetation Types/Land Covers[1]	Federal Status[2]	State Status[3]
Tracy's eriastrum	*Eriastrum tracyi*	**Forest/woodland communities**: Californian broadleaf forest and woodland, Californian montane conifer forest, western Great Basin montane conifer woodland **Scrub and chaparral communities**: Californian xeric chaparral, intermountain dry shrubland and grassland, intermountain west mesic tall sagebrush shrubland and steppe	BLM	(CRPR 1B.2)
White-bracted spineflower	*Chorizanthe xanti* var. *leucotheca*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.2)
White-margined beardtongue	*Penstemon albomarginatus*	**Dune/rocky, barren, and unvegetated communities:** North American warm desert dunes and sand flats, North American warm desert bedrock cliff and outcrop **Scrub and chaparral communities:** Lower bajada and fan Mojavean–Sonoran desert scrub **Land cover:** Rural	BLM	(CRPR 1B.1)
Wildrose Canyon buckwheat	*Eriogonum eremicola*	**CDCA Area outside DRECP Boundary**	BLM	(CRPR 1B.3)
Wiggins' croton	*Croton wigginsii*	**Dune/rocky, barren, and unvegetated communities**: North American warm desert dunes and sand flats **Scrub and chaparral communities**: Lower bajada and fan Mojavean–Sonoran desert scrub, Madrean warm semi-desert wash woodland/scrub	BLM	(CRPR 1B.2)

Sources: CDFW 2013a and CBI 2013.

1 Bold text refers to General Community Grouping followed by vegetation types in nonbolded text, consistent with Table III.7-11.

2 Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern; Eagle Act: Bald and Golden Eagle Protection Act.

3 State Status – SE: California Endangered; ST: California Threatened; SC: California Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; WBWG: Western Bat Working Group species. California Rare Plant Rank (CRPR, formerly known as the CNPS List) – CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere; CRPR 3: Plants which need more information; CRPR 4: Limited distribution – a Watch List.

4 Indicates BLM Special-Status Species that have associated Conservation and Management Actions (CMAs), detailed in Volume II, Chapter II.3, Section II.3.4.2.

5 Caves, seeps/springs, and dunes, by virtue of the specialized environmental conditions, support several endemic invertebrate species that have adapted to and are restricted to these micro-habitats. The available data evaluated was not species-specific enough to include and itemize each of these species. None of these species are listed by the state or

federal agencies as sensitive. Species encompassed by the general groupings are as follows: Dunes–Algodones sand jewel beetle (*Lepismadora algondones*), Andrew's dune scarab beetle (*Pseudocotalpa andrewsi*), Carlson's dune beetle (*Anomala carlsoni*), Hardy's dune beetle (*Anomala hardyorum*), Kelso Jerusalem cricket (*Ammopelmatus kelsoensis*); Seeps/Springs–Amargosa naucorid bug (*Pelocoris shoshone*), badwater snail (*Assiminea infima*), Death Valley agabus diving beetle (*Agabus rumpii*), Death Valley June beetle (Polyphylla barbata), Grapevine Springs elongate tryonia (*Tryonia margae*), Grapevine Springs squat tryonia (*Tryonia rowlandsi*), Nevares Spring naucorid bug (*Ambrysus funebris*), and Cave–Kokoweef Crystal Cave harvestman (*Texella kokoweef*).

Several of the Non-Focus BLM Special-Status Species found in the LUPA Decision Area are federally listed as threatened or endangered and have designated critical habitat present. Table III.7-58 details these species, including the total acres of critical habitat on BLM-managed lands in the LUPA Decision Area.

Table III.7-58
Designated Critical Habitat Within the LUPA Decision Area for Non-Focus BLM Special-Status Species

Common Name	Scientific Name	Federal Status[1]	State Status[2]	Critical Habitat within the LUPA Decision Area (BLM acres)
Amphibians				
Arroyo toad	*Anaxyrus (Bufo) californicus*	FE	CSC	30
Mammals				
Amargosa vole	*Microtus californicus scirpensis*	FE, BLM[3]	SE	4,000
Bighorn sheep (Peninsular Ranges DPS)	*Ovis canadensis nelsoni*	FE, BLM	ST, FP	7,000
Plants				
Amargosa nitrophila	*Nitrophila mohavensis*	FE	SE, (CRPR 1B.2)	1,000
Ash Meadows gumplant	*Grindelia fraxinipratensis*	FT	(CRPR 1B.2)	300
Cushenbury buckwheat	*Eriogonum ovalifolium* var. *vineum*	FE	(CRPR 1B.1)	400
Cushenbury milk-vetch	*Astragalus albens*	FE	(CRPR 1B.1)	800
Cushenbury oxytheca	*Acanthoscyphus parishii* var. *goodmaniana*	FE	(CRPR 1B.1)	80
Lane Mountain milk-vetch	*Astragalus jaegerianus*	FE	(CRPR 1B.1)	10,000
Pierson's milk-vetch	*Astragalus magdalenae* var. *peirsonii*	FT	SE	12,000

Sources: CDFW 2013a; CBI 2013.

[1] Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern; Eagle Act: Bald and Golden Eagle Protection Act.

[2] State Status – SE: California Endangered; ST: California Threatened; SC: California Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; WBWG: Western Bat Working Group species. California Rare Plant Rank

(CRPR, formerly known as the CNPS List) – CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere.

[3] Indicates BLM Special-Status Species that have associated CMAs, detailed in Volume II, Chapter II.3, Section II.3.4.2.

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total in the table.

III.7.6.4.1 Summary of Non-Focus BLM Special-Species

The following sections identify Non-Focus BLM Special-Status Species known to occur in each ecoregion subarea as well as the CDCA Area outside the DRECP boundary. The species included are based on the list of Non-Focus BLM Special-Status Species identified in Table III.7-57 for the LUPA Decision Area.

Cadiz Valley and Chocolate Mountains Ecoregion Subarea

Table III.7-59 lists the Non-Focus BLM Special-Status Species within the Cadiz Valley and Chocolate Mountains ecoregion subarea.

Table III.7-59
Non-Focus BLM Special-Status Species Within the Cadiz Valley and Chocolate Mountains Ecoregion Subarea

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Amphibians/Reptiles			
Banded gila monster	*Heloderma suspectum cinctum*	BLM	CSC
Couch's spadefoot	*Scaphiopus couchii*	BLM	CSC
Birds			
Arizona Bell's vireo	*Vireo bellii arizonae*	BLM	SE
Bald eagle	*Haliaeetus leucocephalus*	Eagle Act	SE
Elf owl	*Micrathene whitneyi*	BLM, BCC	SE
Gilded flicker	*Colaptes chrysoides*	BLM, BCC	SE
Le Conte's thrasher	*Toxostoma lecontei*	BLM	CSC
Lucy's warbler	*Oreothlypis luciae*	BCC	CSC
Mammals			
Bighorn sheep (Peninsular Ranges DPS)	*Ovis canadensis nelson*	FE, BLM	ST, FP
Cave myotis	*Myotis velifer*	BLM	CSC
Spotted bat	*Euderma maculatum*	BLM	CSC
Western mastiff bat	*Eumops perotis*	BLM	CSC
Yuma myotis	*Myotis yumanensis*	BLM	None

Table III.7-59
Non-Focus BLM Special-Status Species Within the Cadiz Valley and Chocolate Mountains Ecoregion Subarea

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Plants			
Coachella Valley milk-vetch	*Astragalus lentiginosus* var. *coachellae*	FE	(CRPR 1B.2)
Harwood's eriastrum	*Eriastrum harwoodii*	BLM	(CRPR 1B.2)
Orocopia sage	*Salvia greatae*	BLM	(CRPR 1B.3)

Sources: CDFW 2013a; CBI 2013.

[1] Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern; Eagle Act: Bald and Golden Eagle Protection Act.

[2] State Status – SE: California Endangered; ST: California Threatened; SC: California Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; WBWG: Western Bat Working Group species. California Rare Plant Rank (CRPR, formerly known as the CNPS List) – CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere.

Imperial Borrego Valley Ecoregion Subarea

Table III.7-60 lists the Non-Focus BLM Special-Status Species within the Imperial Borrego Valley ecoregion subarea.

Table III.7-60
Non-Focus BLM Special-Status Species Within the Imperial Borrego Valley Ecoregion Subarea

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Amphibians/Reptiles			
Banded gila monster	*Heloderma suspectum cinctum*	BLM	CSC
Barefoot gecko	*Coleonyx switaki*	BLM	ST
Colorado desert fringe-toed lizard	*Uma notata*	BLM	CSC
Couch's spadefoot	*Scaphiopus couchii*	BLM	CSC
Birds			
Arizona Bell's vireo	*Vireo bellii arizonae*	BLM	SE
Bald eagle	*Haliaeetus leucocephalus*	Eagle Act	SE
Bank swallow	*Riparia riparia*	BLM	ST
Elf owl	*Micrathene whitneyi*	BLM, BCC	SE
Gilded flicker	*Colaptes chrysoides*	BLM, BCC	SE
Le Conte's thrasher	*Toxostoma lecontei*	BLM	CSC
Lucy's warbler	*Oreothlypis luciae*	BLM, BCC	CSC
White-tailed kite	*Elanus leucurus*	BLM	FP

Table III.7-60
Non-Focus BLM Special-Status Species Within the Imperial Borrego Valley Ecoregion Subarea

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Mammals			
Bighorn sheep (Peninsular Ranges DPS)	*Ovis canadensis nelson*	FE, BLM	ST, FP
Cave myotis	*Myotis velifer*	BLM	CSC
Spotted bat	*Euderma maculatum*	BLM	CSC
Western mastiff bat	*Eumops perotis*	BLM	CSC
Yuma myotis	*Myotis yumanensis*	BLM	None
Plants			
Algodones Dunes sunflower	*Helianthus niveus* ssp. *tephrodes*	BLM	SE
Chaparral sand-verbena	*Abronia villosa* var. *aurita*	BLM	(CRPR 1B.1)
Harwood's eriastrum	*Eriastrum harwoodii*	BLM	(CRPR 1B.2)
Orcutt's woody-aster	*Xylorhiza orcuttii*	BLM	(CRPR 1B.2)
Orocopia sage	*Salvia greatae*	BLM	(CRPR 1B.3)
Pierson's milk-vetch	*Astragalus magdalenae* var. *peirsonii*	FT	SE
Sand food	*Pholisma sonorae*	BLM	(CRPR 1B.2)
Wiggins' croton	*Croton wigginsii*	BLM	(CRPR 1B.2)

Sources: CDFW 2013a; CBI 2013.

[1] Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern; Eagle Act: Bald and Golden Eagle Protection Act.

[2] State Status – SE: California Endangered; ST: California Threatened; SC: California Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; WBWG: Western Bat Working Group species. California Rare Plant Rank (CRPR, formerly known as the CNPS List) – CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere.

Kingston and Funeral Mountains Ecoregion Subarea

Table III.7-61 lists the Non-Focus BLM Special-Status Species within the Kingston and Funeral Mountains ecoregion subarea.

Table III.7-61
Non-Focus BLM Special-Status Species Within the Kingston and Funeral Mountains Ecoregion Subarea

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Invertebrates			
Amargosa springsnail	*Pyrgulopsis amargosae*	BLM[3]	CSC
Amphibians/Reptiles			
Banded gila monster	*Heloderma suspectum cinctum*	BLM	CSC
Birds			
Ferruginous hawk	*Buteo regalis*	BLM	WL
Gray vireo	*Vireo vicinior*	BLM, BCC	CSC
Le Conte's thrasher	*Toxostoma lecontei*	BLM	CSC
Fish			
Amargosa speckled dace	*Rhinichthys osculus* ssp.	BLM[3]	CSC
Amargosa pupfish	*Cyprinodon nevadensis amargosae*	BLM[3]	CSC
Mammals			
Amargosa vole	*Microtus californicus scirpensis*	FE, BLM[3]	SE
Bighorn sheep (Peninsular Ranges DPS)	*Ovis canadensis nelson*	FE, BLM	ST, FP
Fringed myotis	*Myotis thysanodes*	BLM	None
Spotted bat	*Euderma maculatum*	BLM	CSC
Western mastiff bat	*Eumops perotis*	BLM	CSC
Plants			
Amargosa beardtongue	*Penstemon fruticiformis* var. *amargosae*	BLM	(CRPR 1B.3)
Amargosa nitrophila	*Nitrophila mohavensis*	FE	SE, (CRPR 1B.2)
Ash Meadows gumplant	*Grindelia fraxino-pratensis*	FT	(CRPR 1B.2)
Forked buckwheat	*Eriogonum bifurcatum*	BLM	(CRPR 1B.2)
Harwood's eriastrum	*Eriastrum harwoodii*	BLM	(CRPR 1B.2)
Parish's phacelia	*Phacelia parishii*	BLM	(CRPR 1B.1)
Rusby's desert-mallow	*Sphaeralcea rusbyi* var. *eremicola*	BLM	(CRPR 1B.2)
Scrub lotus	*Acmispon argyraeus* var. *multicaulis*	BLM	(CRPR 1B.3)
Stephen's beardtongue	*Penstemon stephensii*	BLM	(CRPR 1B.3)

Sources: CDFW 2013a; CBI 2013.

1 Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern; Eagle Act: Bald and Golden Eagle Protection Act.

2 State Status – SE: California Endangered; ST: California Threatened; SC: California Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; WBWG: Western Bat Working Group species. California Rare Plant Rank (CRPR, formerly known as the CNPS List) – CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere.

3 Indicates BLM species that have associated CMAs, detailed in Volume II, Chapter II.3, Section II.3.4.2.

Mojave and Silurian Valley Ecoregion Subarea

Table III.7-62 lists the Non-Focus BLM Special-Status Species within the Mojave and Silurian Valley ecoregion subarea.

Table III.7-62
Non-Focus BLM Special-Status Species Within the Mojave and Silurian Valley Ecoregion Subarea

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Amphibians/Reptiles			
Western pond turtle	*Emys marmorata*	BLM	CSC
Birds			
Bank swallow	*Riparia riparia*	BLM	ST
Le Conte's thrasher	*Toxostoma lecontei*	BLM	CSC
Lucy's warbler	*Oreothlypis luciae*	BLM, BCC	CSC
Fish			
Amargosa speckled dace	*Rhinichthys osculus* ssp.	BLM[3]	CSC
Amargosa pupfish	*Cyprinodon nevadensis amargosae*	BLM[3]	CSC
Mammals			
Bighorn sheep (Peninsular Ranges DPS)	*Ovis canadensis nelson*	FE, BLM	ST, FP
Spotted bat	*Euderma maculatum*	BLM	CSC
Western mastiff bat	*Eumops perotis*	BLM	CSC
Plants			
Amargosa beardtongue	*Penstemon fruticiformis* var. *amargosae*	BLM	(CRPR 1B.3)
Amargosa nitrophila	*Nitrophila mohavensis*	FE	SE, (CRPR 1B.2)
Creamy blazing star	*Mentzelia tridentata*	BLM	(CRPR 1B.3)
Harwood's eriastrum	*Eriastrum harwoodii*	BLM	(CRPR 1B.2)
Lane Mountain milk-vetch	*Astragalus jaegerianus*	FE	(CRPR 1B.1)
Parish's phacelia	*Phacelia parishii*	BLM	(CRPR 1B.1)
Red Rock poppy	*Eschscholzia minutiflora* ssp. *twisselmannii*	BLM	(CRPR 1B.2)

Sources: CDFW 2013a; CBI 2013.

1 Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern; Eagle Act: Bald and Golden Eagle Protection Act.

2 State Status – SE: California Endangered; ST: California Threatened; SC: California Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; WBWG: Western Bat Working Group species. California Rare Plant Rank (CRPR, formerly known as the CNPS List) – CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere.

3 Indicates BLM species that have associated CMAs, detailed in Volume II, Chapter II.3, Section II.3.4.2.

Owens River Valley Ecoregion Subarea

Table III.7-63 lists the Non-Focus BLM Special-Status Species within the Owens River Valley ecoregion subarea.

Table III.7-63
Non-Focus BLM Special-Status Species Within the Owens River Valley Ecoregion Subarea

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Birds			
Bald eagle	*Haliaeetus leucocephalus*	Eagle Act	SE
Bank swallow	*Riparia riparia*	BLM	ST
Le Conte's thrasher	*Toxostoma lecontei*	BLM	CSC
Mammals			
Long-eared myotis	*Myotis evotis*	BLM	None
Owen's valley vole	*Microtus californicus vallicola*	BLM	CSC
Spotted bat	*Euderma maculatum*	BLM	CSC
Western mastiff bat	*Eumops perotis californicus*	BLM	CSC
Yuma myotis	*Myotis yumanensis*	BLM	None
Plants			
Creamy blazing star	*Mentzelia tridentata*	BLM	(CRPR 1B.3)
Inyo County star-tulip	*Calochortus excavatus*	BLM	(CRPR 1B.1)

Sources: CDFW 2013a and CBI 2013.

1 Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern; Eagle Act: Bald and Golden Eagle Protection Act.

2 State Status – SE: California Endangered; ST: California Threatened; SC: California Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; WBWG: Western Bat Working Group species. California Rare Plant Rank (CRPR, formerly known as the CNPS List) – CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere.

Panamint Death Valley Ecoregion Subarea

Table III.7-64 lists the Non-Focus BLM Special-Status Species within the Panamint Death Valley ecoregion subarea.

Table III.7-64
Non-Focus BLM Special-Status Species Within the Panamint Death Valley Ecoregion Subarea

Common Name	Scientific Name	Federal Status[1]	State Status[2]
	Birds		
Inyo California towhee	*Melozone* [=*Pipilo*] *crissalis eremophilus*	FT	SE
Le Conte's thrasher	*Toxostoma lecontei*	BLM	CSC
	Fish		
Amargosa pupfish	*Cyprinodon nevadensis amargosae*	BLM[3]	CSC
	Mammals		
Bighorn sheep (Peninsular Ranges DPS)	*Ovis canadensis nelson*	FE, BLM	ST, FP
Fringed myotis	*Myotis thysanodes*	BLM	None
Spotted bat	*Euderma maculatum*	BLM	CSC
Western mastiff bat	*Eumops perotis californicus*	BLM	CSC
	Plants		
Amargosa beardtongue	*Penstemon fruticiformis* var. *amargosae*	BLM	(CRPR 1B.3)
Charlotte's phacelia	*Phacelia nashiana*	BLM	(CRPR 1B.2)
Red Rock poppy	*Eschscholzia minutiflora* ssp. *twisselmannii*	BLM	(CRPR 1B.2)
Red Rock tarplant	*Deinandra arida*	BLM	(CRPR 1B.2)

Sources: CDFW 2013a; CBI 2013.

1 Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern; Eagle Act: Bald and Golden Eagle Protection Act.

2 State Status – SE: California Endangered; ST: California Threatened; SC: California Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; WBWG: Western Bat Working Group species. California Rare Plant Rank (CRPR, formerly known as the CNPS List) – CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere.

3 Indicates BLM species that have associated CMAs, detailed in Volume II, Chapter II.3, Section II.3.4.2.

Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

Table III.7-65 lists the Non-Focus BLM Special-Status Species within the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea.

Table III.7-65
Non-Focus BLM Special-Status Species Within the Pinto Lucerne Valley andEastern Slopes Ecoregion Subarea

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Amphibians/Reptiles			
Arroyo toad	*Anaxyrus (Bufo) californicus*	FE	CSC
Coast horned lizard	*Phrynosoma blainvillii*	BLM	CSC
Birds			
Gray vireo	*Vireo vicinior*	BLM, BCC	CSC
Le Conte's thrasher	*Toxostoma lecontei*	BLM	CSC
Lucy's warbler	*Oreothlypis luciae*	BLM, BCC	CSC
Mammals			
Bighorn sheep (Peninsular Ranges DPS)	*Ovis canadensis nelson*	FE, BLM	ST, FP
Spotted bat	*Euderma maculatum*	BLM	CSC
Western mastiff bat	*Eumops perotis californicus*	BLM	CSC
Plants			
Creamy blazing star	*Mentzelia tridentata*	BLM	(CRPR 1B.3)
Cushenbury buckwheat	*Eriogonum ovalifolium* var. *vineum*	FE	(CRPR 1B.1)
Cushenbury milk-vetch	*Astragalus albens*	FE	(CRPR 1B.1)
Cushenbury oxytheca	*Acanthoscyphus parishii* var. *goodmaniana*	FE	(CRPR 1B.1)
Parish's phacelia	*Phacelia parishii*	BLM	(CRPR 1B.1)
Robison's monardella	*Monardella robisonii*	BLM	(CRPR 1B.3)
San Bernardino Mountains dudleya	*Dudleya abramsii* ssp. *affinis*	BLM	(CRPR 1B.2)

Sources: CDFW 2013a; CBI 2013.

[1] Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern; Eagle Act: Bald and Golden Eagle Protection Act.

[2] State Status – SE: California Endangered; ST: California Threatened; SC: California Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; WBWG: Western Bat Working Group species. California Rare Plant Rank (CRPR, formerly known as the CNPS List) – CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere.

Piute Valley and Sacramento Mountains Ecoregion Subarea

Table III.7-66 lists the Non-Focus BLM Special-Status Species within the Piute Valley and Sacramento Mountains ecoregion subarea.

Table III.7-66
Non-Focus BLM Special-Status Species Within the Piute Valley and Sacramento Mountains Ecoregion Subarea

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Amphibians/Reptiles			
Couch's spadefoot	*Scaphiopus couchii*	BLM	CSC
Birds			
Arizona Bell's vireo	*Vireo bellii arizonae*	BLM	SE
Bald eagle	*Haliaeetus leucocephalus*	Eagle Act	SE
Elf owl	*Micrathene whitneyi*	BLM, BCC	SE
Gilded flicker	*Colaptes chrysoides*	BLM, BCC	SE
Le Conte's thrasher	*Toxostoma lecontei*	BLM	CSC
Lucy's warbler	*Oreothlypis luciae*	BLM, BCC	CSC
Mammals			
Bighorn sheep (Peninsular Ranges DPS)	*Ovis canadensis nelson*	FE, BLM	ST, FP
Spotted bat	*Euderma maculatum*	BLM	CSC
Western mastiff bat	*Eumops perotis californicus*	BLM	CSC
Yuma myotis	*Myotis yumanensis*	BLM	None

Sources: CDFW 2013a; CBI 2013.

[1] Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern; Eagle Act: Bald and Golden Eagle Protection Act.

[2] State Status – SE: California Endangered; ST: California Threatened; SC: California Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; WBWG: Western Bat Working Group species. California Rare Plant Rank (CRPR, formerly known as the CNPS List) – CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere.

Providence and Bullion Mountains Ecoregion Subarea

Table III.7-67 lists the Non-Focus BLM Special-Status Species within the Providence and Bullion Mountains ecoregion subarea.

Table III.7-67
Non-Focus BLM Special-Status Species Within the Providence and Bullion Mountains Ecoregion Subarea

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Amphibians/Reptiles			
Banded gila monster	*Heloderma suspectum cinctum*	BLM	CSC
Coast horned lizard	*Phrynosoma blainvillii*	BLM	CSC

Table III.7-67
Non-Focus BLM Special-Status Species Within the Providence and Bullion Mountains Ecoregion Subarea

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Birds			
Arizona Bell's vireo	*Vireo bellii arizonae*	BLM	SE
Bald eagle	*Haliaeetus leucocephalus*	Eagle Act	SE
Gray vireo	*Vireo vicinior*	BLM, BCC	CSC
Le Conte's thrasher	*Toxostoma lecontei*	BLM	CSC
Loggerhead shrike	*Lanius ludovicianus*	BCC	CSC
Lucy's warbler	*Oreothlypis luciae*	BLM, BCC	CSC
Mammals			
Bighorn sheep (Peninsular Ranges DPS)	*Ovis canadensis nelson*	FE, BLM	ST, FP
Spotted bat	*Euderma maculatum*	BLM	CSC
Western mastiff bat	*Eumops perotis californicus*	BLM	CSC
Plants			
Harwood's eriastrum	*Eriastrum harwoodii*	BLM	(CRPR 1B.2)
Robison's monardella	*Monardella robisonii*	BLM	(CRPR 1B.3)
Rusby's desert-mallow	*Sphaeralcea rusbyi* var. *eremicola*	BLM	(CRPR 1B.2)
Scrub lotus	*Acmispon argyraeus* var. *multicaulis*	BLM	(CRPR 1B.3)
Stephen's beardtongue	*Penstemon stephensii*	BLM	(CRPR 1B.3)
White-margined beardtongue	*Penstemon albomarginatus*	BLM	(CRPR 1B.1)

Sources: CDFW 2013a; CBI 2013.

[1] Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern; Eagle Act: Bald and Golden Eagle Protection Act.

[2] State Status – SE: California Endangered; ST: California Threatened; SC: California Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; WBWG: Western Bat Working Group species. California Rare Plant Rank (CRPR, formerly known as the CNPS List) – CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere.

West Mojave and Eastern Slopes Ecoregion Subarea

Table III.7-68 lists the Non-Focus BLM Special-Status Species within the West Mojave and Eastern Slopes ecoregion subarea.

Table III.7-68
Non-Focus BLM Special-Status Species Within the West Mojave and Eastern Slopes Ecoregion Subarea

Common Name	Scientific Name	Federal Status[1]	State Status[2]
Amphibians/Reptiles			
Arroyo toad	*Anaxyrus (Bufo) californicus*	FE	CSC
Coast horned lizard	*Phrynosoma blainvillii*	BLM	CSC
Western pond turtle	*Emys marmorata*	BLM	CSC
Birds			
Bald eagle	*Haliaeetus leucocephalus*	Eagle Act	SE
Bank swallow	*Riparia riparia*	BLM	ST
Gray vireo	*Vireo vicinior*	BLM, BCC	CSC
Le Conte's thrasher	*Toxostoma lecontei*	BLM	CSC
White-tailed kite	*Elanus leucurus*	BLM	FP
Mammals			
Spotted bat	*Euderma maculatum*	BLM	CSC
Western mastiff bat	*Eumops perotis californicus*	BLM	CSC
Yellow-eared pocket mouse	*Perognathus parvus xanthonotus*	BLM	None
Yuma myotis	*Myotis yumanensis*	BLM	None
Plants			
Chaparral sand-verbena	*Abronia villosa* var. *aurita*	BLM	(CRPR 1B.1)
Charlotte's phacelia	*Phacelia nashiana*	BLM	(CRPR 1B.2)
Creamy blazing star	*Mentzelia tridentata*	BLM	(CRPR 1B.3)
Kelso Creek monkeyflower	*Mimulus shevockii*	BLM	(CRPR 1B.2)
Kern buckwheat	*Eriogonum kennedyi* var. *pinicola*	BLM	(CRPR 1B.1)
Pale-yellow layia	*Layia heterotricha*	BLM	(CRPR 1B.1)
Parish's phacelia	*Phacelia parishii*	BLM	(CRPR 1B.1)
Red Rock poppy	*Eschscholzia minutiflora* ssp. *twisselmannii*	BLM	(CRPR 1B.2)
Red Rock tarplant	*Deinandra arida*	BLM	(CRPR 1B.2)
Short-joint beavertail cactus	*Opuntia basilaris* var. *brachyclada*	BLM	(CRPR 1B.2)
Spanish needle onion	*Allium shevockii*	BLM	(CRPR 1B.3)
Tracy's eriastrum	*Eriastrum tracyi*	BLM	(CRPR 1B.2)

Sources: CDFW 2013a; CBI 2013.

[1] Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern; Eagle Act: Bald and Golden Eagle Protection Act.

[2] State Status – SE: California Endangered; ST: California Threatened; SC: California Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; WBWG: Western Bat Working Group species. California Rare Plant Rank (CRPR, formerly known as the CNPS List) – CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere.

III.7.7 Invasive Species

III.7.7.1 Invasive Plant Species

Many of the land uses and human-caused impacts discussed in Section II.C.6 of the Draft Framework Conservation Strategy Report (Dudek and ICF 2011), and in Sections III.7.7.1 and III.7.7.2, promote the invasion of the desert native communities by non-native species through various mechanisms. Invasive plant species often compete with native plant species, leading to reduced native seedling germination and establishment, ultimately reducing the ability of vegetation to recover from disturbance or adapt to future climate change. Non-native plants were recorded in the California deserts as early as 1735 based on the presence of red-stemmed filaree (*Erodium cicutarium*) in woodrat middens near Death Valley. Botanist John Frémont made no notes of weeds or other nondesert plants during his travels in the desert regions in 1844, indicating that non-native species were not yet prevalent at the time (Pavlik 2008, as cited in Appendix Q). The early proliferation of non-native species was associated with agriculture and grazing, introducing non-natives such as tumbleweed (*Amaranthus albus*), Russian thistle (*Salsola tragus*), goosefoot (*Chenopodium murale*), and annual beard grass (*Polypogon monspeliensis*). Cheatgrass (*Bromus tectorum*), the seeds of which were commonly included in sources of wheat seed, was widespread in arid western lands by the 1930s (Pavlik 2008, as cited in Appendix Q).

There are currently about 232 taxa (10%) in the California deserts that are non-native (Baldwin et al. 2002, as cited in Appendix Q), of which about 27 are considered to be noxious weeds (Pavlik 2008, as cited in Appendix Q). Several types of modern human activities and land uses in the desert regions can promote invasions of non-native species, including (1) paved and dirt roads and OHV activities that disturb soils and create trails; (2) access roads and edges around utilities and mines; (3) linear disturbances such as transmission lines; (4) military activities; and (5) grazing. Common weeds and non-native grasses associated with these activities and land uses include Russian thistle, tumbleweed, Sahara mustard (*Brassica tournefortii*), London rocket (*Sisymbrium irio*), tansy mustard (*Descurainia* spp.), short-pod mustard (*Hirschfeldia incana*), fiddleneck (*Amsinckia tessellata*), red-stemmed filaree, Mediterranean grass (*Schismus barbatus* and *S. arabicus*), red brome (*Bromus madritensis* ssp. *rubens*), and cheatgrass (in the Great Basin Desert; Brooks and Lair 2009; Pavlik 2008, as cited in Appendix Q). Sahara mustard, in particular, has become one of the most invasive species in the desert landscape (Holt and Barrows 2013).

Invasive plant species are common in desert wetland and riparian communities; approximately 20% of the plant species along the Mojave River are non-native. Most of the invasive species in Mojave Desert wetlands and riparian habitats are low-growing herbaceous species and include sweet clovers (*Melilotus* spp.), pepperweed (*Lepidium*

spp.), dock (*Rumex* spp.), annual beard grass, sow thistle (*Sonchus* spp.), and Bermuda grass (Dudley 2009, as cited in Appendix Q).

One of the most pernicious and widespread invasive species in desert riparian systems is tamarisk (also called saltcedar), which invades arroyos and streambeds (Dudley 2009; Pavlik 2008, as cited in Appendix Q). It is common along the Mojave and Amargosa rivers in the Mojave Desert (Dudley 2009; Pavlik 2008, as cited in Appendix Q) and along the lower Colorado River (Pavlik 2008, as cited in Appendix Q), as well as other scattered areas throughout the LUPA Decision Area. Tamarisk is extremely drought-tolerant and has great reproductive capacity, providing it a competitive advantage over many native riparian species such as cottonwoods and willows.

III.7.7.2 Invasive Wildlife Species

Desert regions support several non-native wildlife species that can degrade native habitats, compete for resources with native species, and increase predation pressure on native species. These include American bullfrog, a voracious omnivore known to prey on native fish species; mosquitofish (*Gambusia affinis*), a predator of native fish species; house sparrow (*Passer domesticus*) and European starling (*Sturnus vulgaris*), which compete with native birds for nest cavities; Eurasian collared-dove; house mouse (*Mus musculus*); burros (*Equus asinus*); horses (*E. caballus*); and domestic dogs, which can be a substantial source of mortality in some areas for species like desert tortoise (Pavlik 2008, as cited in Appendix Q; Boarman 2006). The presence of the house mouse, for example, was negatively correlated with the number of Amargosa voles at study sites, but whether there is direct or indirect interspecific competition (e.g., for resources) or direct behavioral exclusion is unknown (McClenaghan and Montgomery 1998; USFWS 2009f). While the Eurasian collared-dove is rapidly spreading in North America, its potential impact on native species such as mourning dove is unknown (Romagosa 2012).

Other species native to North America but formerly absent from or uncommon in desert areas have increased in abundance in association with human activities and land uses. Predation by common ravens substantially impacts desert tortoise populations. Ravens take advantage of transmission structures for nesting, perching, resting, and foraging. Ravens are also attracted to garbage from landfills and trash containers; water from sewage ponds and municipal areas; and billboards, bridges, and buildings for nesting sites. Coyotes, which prey on adult tortoises, also are attracted to landfills where coyote populations can increase (USFWS 2011c).

Brown-headed cowbirds (*Molothrus ater*), which have increased in Southern California in association with grazing and other agricultural activities, is a brood parasite of several endangered species that nest in the lower Colorado River and other riparian habitats in the LUPA Decision Area. As a brood parasite, it lays eggs in the nests of other species, and its

young are tended by the parasitized species. Species often parasitized by the brown-headed cowbird include southwestern willow flycatcher, least Bell's vireo, and other neotropical migrants (Heath 2008, as cited in Appendix Q).

The red swamp crayfish (*Procambarus clarkii*) was introduced to California in the early 1900s from Louisiana. It is now found throughout Southern California in ponds, slower streams and creeks, and irrigation canals in both freshwater and brackish environments. Red swamp crayfish are omnivorous, feeding on aquatic plants, snails, insects, fish, and amphibian eggs and young (Martinez 2012), and have been found to reduce amphibian populations in California through direct predation, alteration of habitat through burrowing and sedimentation, and competition for habitat. Nonindigenous crayfishes have greatly altered North American lake and stream ecosystems, harmed fisheries, and extirpated many populations of native species (Hyatt n.d.). Within the LUPA Decsion Area, the red swamp crayfish is known to occur along the Colorado, Owens, and Mojave River valleys (USGS 2012), as well as within the irrigation conveyance systems in the agricultural complex of the Imperial Valley.

Argentine ants (*Linepithema humile*) typically invade ecosystems along the fringes of urban or agricultural development, where water is present in an otherwise arid environment. Argentine ants can displace native harvester ants, reducing the availability of native ant prey for horned lizards (Suarez and Case 2002).

Burros and horses trample soils and vegetation, particularly in wetland and riparian areas, and therefore are considered to be a threat to several of the special-status species in the LUPA Decision Area. Burros are identified threats to Sodaville milk-vetch (*Astragalus lentiginosus* var. *sesquimetralis*), and horses are identified threats to Amargosa niterwort (*Nitrophila mohavensis*) and Ash Meadows gumplant (*Grindelia fraxinipratensis*). Burros, originally introduced to the western hemisphere in the fifteenth century by Christopher Columbus, were brought as pack animals to the southwestern United States during the California gold rush in the mid-1800s (GISD 2012). Feral burro populations in the California desert have deleterious and potentially irreversible impacts on native flora and fauna (GISD 2012; Stubbs 1999). Damage has been documented in plant communities, soils, wildlife, and water quality, including habitat for native desert species that are threatened or endangered, such as the desert tortoise and bighorn sheep (GISD 2012; Stubbs 1999). At water sources, burros often compact the soil, foul the water with fecal material, and create water turbidity (Weaver 1974). Feral burros outcompete native species for forage and are destructive to plants, often pulling them out by the roots; some plants have been seriously depleted as much as 4 miles from water (Hansen and Fodor 1971, as cited in Weaver 1974). Within the LUPA Decision Area, burros are found primarily in Imperial and San Bernardino counties along, and to the west of, the Colorado River Valley, and in Inyo County. The National Park Service, however, has

conducted burro removal from their lands in the Mojave Desert, with the goal of removing approximately 1,300 burros from the Mojave National Preserve between 1998 and 2001 (Stubbs 1999). BLM also established a burro removal program under their West Mojave Plan to reduce impacts of burros on their land (BLM 2005). Trampling by horses also degrades desert grasslands, scrub, and chaparral.

III.7.8 Landscape Habitat Linkages and Wildlife Movement Corridors

Natural environments are typically heterogeneous and form a mosaic across a landscape. Terrestrial wildlife species occupy favorable patches within a landscape matrix and may move between these patches through less favorable habitats. Wildlife corridors are linear landscape elements that provide for species movement and dispersal between two or more habitats. However, terrestrial wildlife species are more likely to follow pathways between habitat patches that contain elements of their preferred habitat (Rosenberg et al. 1997, as cited in Appendix Q). Disjunct habitat patches used by terrestrial wildlife to negotiate through landscape mosaics have been likened to "stepping-stones," and some researchers (e.g., Bennett 2003, as cited in Appendix Q) have suggested that in some cases and for some species, stepping-stone habitat is as effective as continuous corridors.

There is a distinction between short-distance individual movements, such as foraging within an organism's home range, long-distance dispersal (one-time emigration and immigration events between populations), and migration (seasonal or periodic movements on local or regional scales). Corridors and habitat linkages may allow for long- or short-distance movements, dispersal, and migration depending on the life history requirements and ability of a particular species to travel through a landscape. Wildlife movement and population connectivity also may be examined at three spatial scales: (1) landscape habitat linkages, (2) wildlife corridors, and (3) wildlife crossings.

Landscape habitat linkages are large open space areas on a landscape scale that contain natural habitat and provide a connection between at least two larger adjacent open spaces or habitat areas. Linkages are defined as providing a large enough area to support a natural habitat mosaic and viable populations of smaller terrestrial species, such as rodents, smaller carnivores (e.g., raccoons, skunks, fox, and weasels), passerine birds, amphibians, reptiles, and invertebrates and allowing for gene flow through diffusion of populations over a period of generations, as well as allowing for dispersal of some species between neighboring habitats. Linkages can form large tracts of natural open space and serve both as resident habitat and as connections to larger core habitat areas.

Wildlife corridors are linear landscape elements that provide for species movement and dispersal between two or more habitats, but do not necessarily have enough habitat for all life history requirements of a species, particularly reproduction (Rosenberg et al. 1995,

1997, as cited in Appendix Q). For this reason, while corridors may provide for dispersal of most species, they may not provide for the diffusion of populations over a longer time scale. The main prerequisite for corridors is that they increase animal movement between habitat patches. The mechanisms related to the efficacy of corridors are varied and species-specific (Soulé and Gilpin 1991, Beier and Loe 1992, Rosenberg et al. 1995, and Haddad and Tewksbury 2005, as cited in Appendix Q).

Wildlife crossings are locations where wildlife must pass through physically constrained environments (e.g., roads, development) during movement within home ranges or during dispersal or migration between core areas of suitable habitat. Such crossings can occur within a landscape habitat linkage or within a wildlife corridor. Development and roads may transect or interrupt an existing natural crossing, creating dangerous or impassable barriers that impede the natural movement of a species and possibly subject it to higher risks of injury and mortality from adverse human interactions, such as increased vehicle collisions at roadways where no safe wildlife passage is provided (Meese et al. 2007, as cited in Appendix Q).

In addition to species-specific information on movement corridors and habitat linkages, potential landscape-level habitat linkages and wildlife movement corridors in the DRECP Plan Area have been identified in the California Desert Connectivity Project (Penrod et al. 2012, as cited in Appendix Q), the California Essential Habitat Connectivity Project (Caltrans 2010, as cited in Appendix Q), the South Coast Missing Linkages Project (Beier et al. 2006; South Coast Wildlands 2008, as cited in Appendix Q), and A Linkage Design for the Joshua Tree–Twentynine Palms Connection (Penrod et al. 2008, as cited in Appendix Q).

The California Desert Connectivity Project is intended to provide a comprehensive and detailed habitat connectivity analysis for the California deserts (Penrod et al. 2012, as cited in Appendix Q). The Connectivity Project included both least-cost corridor habitat permeability models for four Focus Species (American badger, kit fox [*Vulpes macrotis*], bighorn sheep, and Agassiz's desert tortoise) and identification of a Desert Linkage Network using "land facet" methods based on the approach described by Beier and Brost (2010, as cited in Appendix Q). Land facets are "recurring landscape units with uniform topographic and soil attributes" that can be employed as a "coarse-filter" conservation strategy to protect areas with a high diversity (Beier and Brost 2010, as cited in Appendix Q). As applied to the DRECP Plan Area, the land facet method is designed to identify "swaths" of habitat of fairly uniform physical conditions that will interact with uncertain climate changes to maintain habitat for species and species' movement (Penrod et al. 2012, as cited in Appendix Q). Each identified linkage consists of a corridor for each land facet and a corridor for high diversity of land facets and should support movement of species associated with that facet (Penrod et al. 2012, as cited in Appendix Q). The Connectivity Project identified 22 crucial linkage planning areas within the DRECP Plan Area. A pair of landscape blocks that should remain connected

defines each crucial linkage planning area. The landscape blocks identified by Penrod et al. (2012, as cited in Appendix Q) include Sierra Nevada, China Lake North Range, China Lake South Range, Kingston–Mesquite Mountains, Mojave National Preserve, EAFB, Twentynine Palms and Newberry-Rodman, San Gabriel and San Bernardino mountain ranges, Joshua Tree National Park, Stepladder–Turtle Mountains, Whipple Mountains, Palen–McCoy Mountains, Chocolate Mountains, East Mesa, and Picacho. Each of these landscape blocks is linked to another landscape block by one or more linkages that meet certain criteria defined by Penrod et al. (2012, as cited in Appendix Q). Finally, Penrod et al. (2012, as cited in Appendix Q) conducted habitat suitability, patch size, and configuration analyses for 44 Focus Species, including 12 mammals, 8 birds, 9 reptiles, 1 amphibian, 5 insects, and 9 plants, to evaluate the configuration and extent of potentially suitable habitat in the linkage network. Penrod et al. (2012, as cited in Appendix Q) contains a detailed discussion of the linkage network identified by the Connectivity Project.

The California Essential Habitat Connectivity Project is coarser in scale than the California Desert Connectivity Project or South Coast Missing Linkages Project (Spencer et al. 2010, as cited in Appendix Q). The California Essential Habitat Connectivity Project did not use Focus Species to identify areas needing connection; rather, it used indices of environmental integrity and other biological inputs to identify large "Natural Landscape Blocks" and "Essential Connectivity Areas" throughout California. These are particularly useful in identifying important areas to conserve outside of conservation priority areas not already conserved or mapped by other efforts.

The South Coast Missing Linkages Project preceded the California Desert Connectivity Project (Penrod et al. 2012, as cited in Appendix Q), which expanded the geographic area from California's South Coast Ecoregion across California's deserts, as discussed above. The South Coast Missing Linkages Project developed several linkage designs that connected portions of the South Coast Ecoregion with the Mojave and Sonoran deserts, and several of those linkage designs are partly within the DRECP Plan Area (Beier et al. 2006; South Coast Wildlands 2008, as cited in Appendix Q). The California Desert Connectivity Project complements the South Coast Missing Linkages Project, using similar analytical tools. The South Coast Missing Linkages Project information was incorporated into Penrod et al. (2012, as cited in Appendix Q) and noted as a previous linkage design.

A Linkage Design for the Joshua Tree–Twentynine Palms Connection identified the Joshua Tree–Twentynine Palms Connection, which lies in an ecological transition zone between the Mojave and Sonoran deserts (Penrod et al. 2008, as cited in Appendix Q). This linkage connects Joshua Tree National Park with the Marine Corps Air Ground Combat Center at Twentynine Palms. As with the South Coast Missing Linkages Project information, this information on the Joshua Tree–Twentynine Palms Connection was incorporated into Penrod et al. (2012, as cited in Appendix Q) and noted as a previous linkage design.

Figures III.7-26 through III.7-36 show identified habitat connectivity areas within the DRECP Plan Area based on the projects described above, and Table III.7-69 shows the acreage of habitat connectivity areas within each DRECP Plan Area ecoregion subarea based on the Desert Linkage Network data (Penrod et al. 2012, as cited in Appendix Q).

Table III.7-69
Acreage of Landscape Habitat Linkages within the DRECP Plan Area by Ecoregion Subarea

Ecoregion Subarea	Desert Linkage Network (acres)
Cadiz Valley and Chocolate Mountains	905,000
Imperial Borrego Valley	207,000
Kingston and Funeral Mountains	174,000
Mojave and Silurian Valley	861,000
Owens River Valley (southern end)	19,000
Panamint Death Valley	255,000
Pinto Lucerne Valley and Eastern Slopes	327,000
Piute Valley and Sacramento Mountains	161,000
Providence and Bullion Mountains	428,000
West Mojave and Eastern Slopes	880,000
Total	**4,216,000**

Source: Penrod et al. 2012, as cited in Appendix Q.
Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Cadiz Valley and Chocolate Mountains Ecoregion Subarea

As shown on Figure III.7-27, landscape habitat linkages cover approximately 905,000 acres within the Cadiz Valley and Chocolate Mountains ecoregion subarea. These linkages are primarily located along the desert valleys, providing connectivity between isolated mountain ranges within the ecoregion subarea. Specific linkages in this ecoregion subarea include the following: Chocolate Mountains–Little Picacho, Joshua Tree National Park–Chocolate Mountains, Joshua Tree National Park–Palen McCoy Mountains, Palen McCoy Mountains–Chocolate Mountains, Palen McCoy Mountains–Little Picacho, Palen McCoy Mountains–Whipple Mountains, and Stepladder Turtle Mountains–Palen McCoy Mountains (Penrod et al. 2012).

Imperial Borrego Valley Ecoregion Subarea

As shown on Figure III.7-28, landscape habitat linkages cover approximately 207,000 acres within the Imperial Borrego Valley ecoregion subarea. These linkages are east of the Salton

Sea/El Centro agricultural complex, and provide connectivity between eastern Imperial County deserts, north into the Cadiz Valley. Specific linkages in this ecoregion subarea include the Chocolate Mountains–Little Picacho and Chocolate Mountains–East Mesa linkages (Penrod et al. 2012).

Kingston and Funeral Mountains Ecoregion Subarea

As shown on Figure III.7-29, landscape habitat linkages cover approximately 174,000 acres within the Kingston and Funeral Mountains ecoregion subarea. These linkages provide connectivity through the mountains, to allow movement between the DRECP Plan Area and habitat in Clark County, Nevada. Specific linkages in this ecoregion subarea include the China Lake South Range–Kingston Mesquite Mountains and Kingston Mesquite Mountains–Mojave National Preserve linkages (Penrod et al. 2012).

Mojave and Silurian Valley Ecoregion Subarea

As shown on Figure III.7-30, landscape habitat linkages cover approximately 861,000 acres within the Mojave and Silurian Valley ecoregion subarea. These linkages are located in the valleys, providing connectivity between mountain ranges within the ecoregion subarea. Specific linkages in this ecoregion subarea include the following: China Lake South Range–Kingston Mesquite Mountains, China Lake South Range– EAFB, China Lake South Range–Sierra Nevada, China Lake South Range–Twentynine Palms and Newberry Rodman, EAFB–Sierra Nevada, Mojave National Preserve–Twentynine Palms, and Newberry Rodman (Penrod et al. 2012).

Owens River Valley Ecoregion Subarea

As shown on Figure III.7-31, landscape habitat linkages cover approximately 19,000 acres within the Owens River Valley ecoregion subarea. These linkages are located in the river valley, providing connectivity between the mountain ranges adjacent to ecoregion subarea. Specifically, this ecoregion subarea includes a portion of the China Lake North Range–Sierra Nevada linkage identified by Penrod et al. (2012). Most of the Owens River Valley ecoregion subarea, north of the linkages shown in Figure III.7-31, is not included in landscape habitat linkage analysis and should be assumed to also include linkages.

Panamint Death Valley Ecoregion Subarea

As shown on Figure III.7-32, landscape habitat linkages cover approximately 255,000 acres within the Panamint Death Valley ecoregion subarea. These linkages are located in the valleys, providing connectivity between mountain ranges within the ecoregion subarea. Specific linkages in this ecoregion subarea include the following: China Lake South Range–Kingston Mesquite Mountains, China Lake South Range–Sierra Nevada, EAFB–Sierra Nevada, and China Lake North Range–China Lake South Range (Penrod et al. 2012).

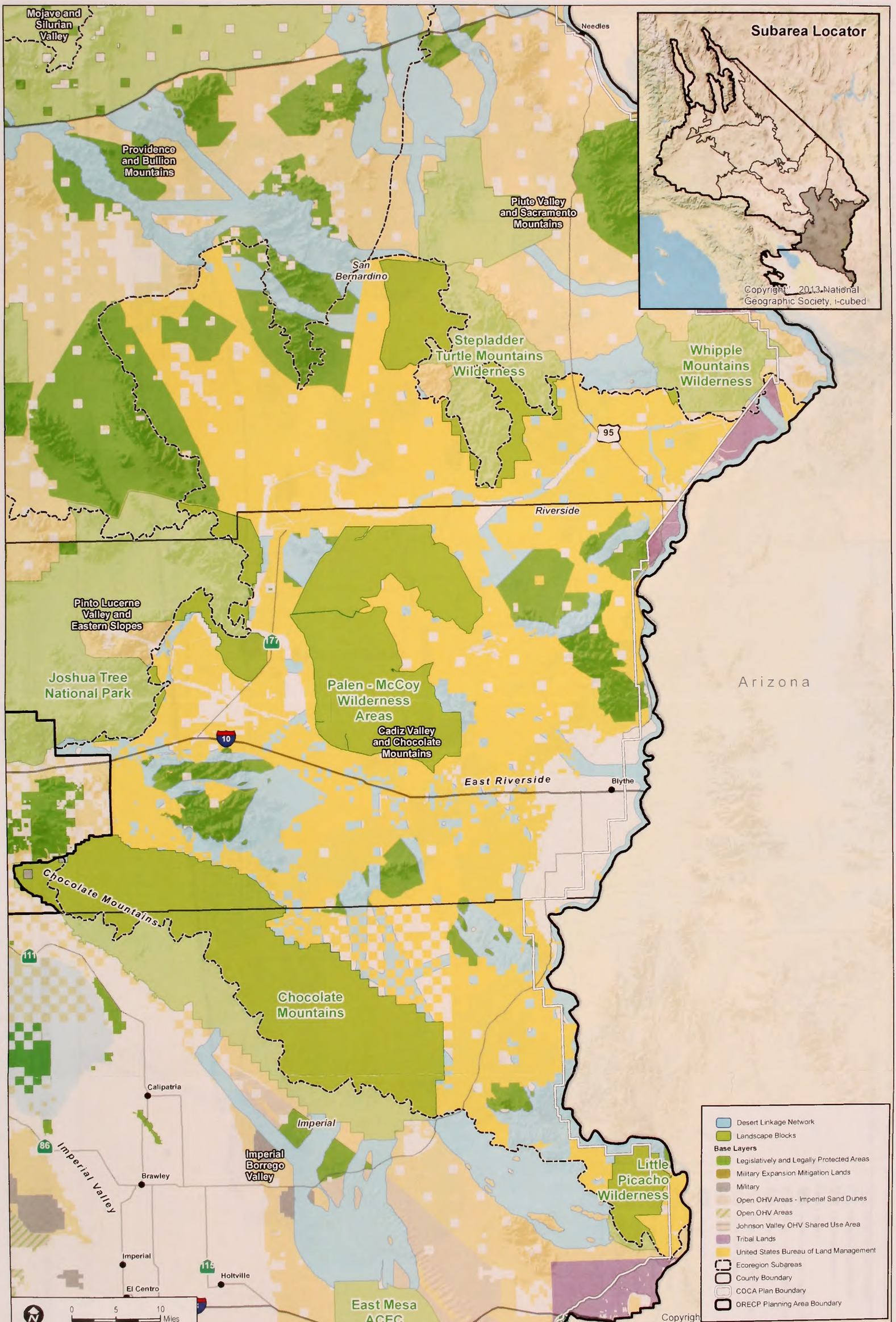


Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); South Coast Wildlands (2012)

FIGURE III.7-26

Habitat Linkages and Wildlife Movement Corridors - Ecoregion Subarea Index Map

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Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); South Coast Wildlands (2012)

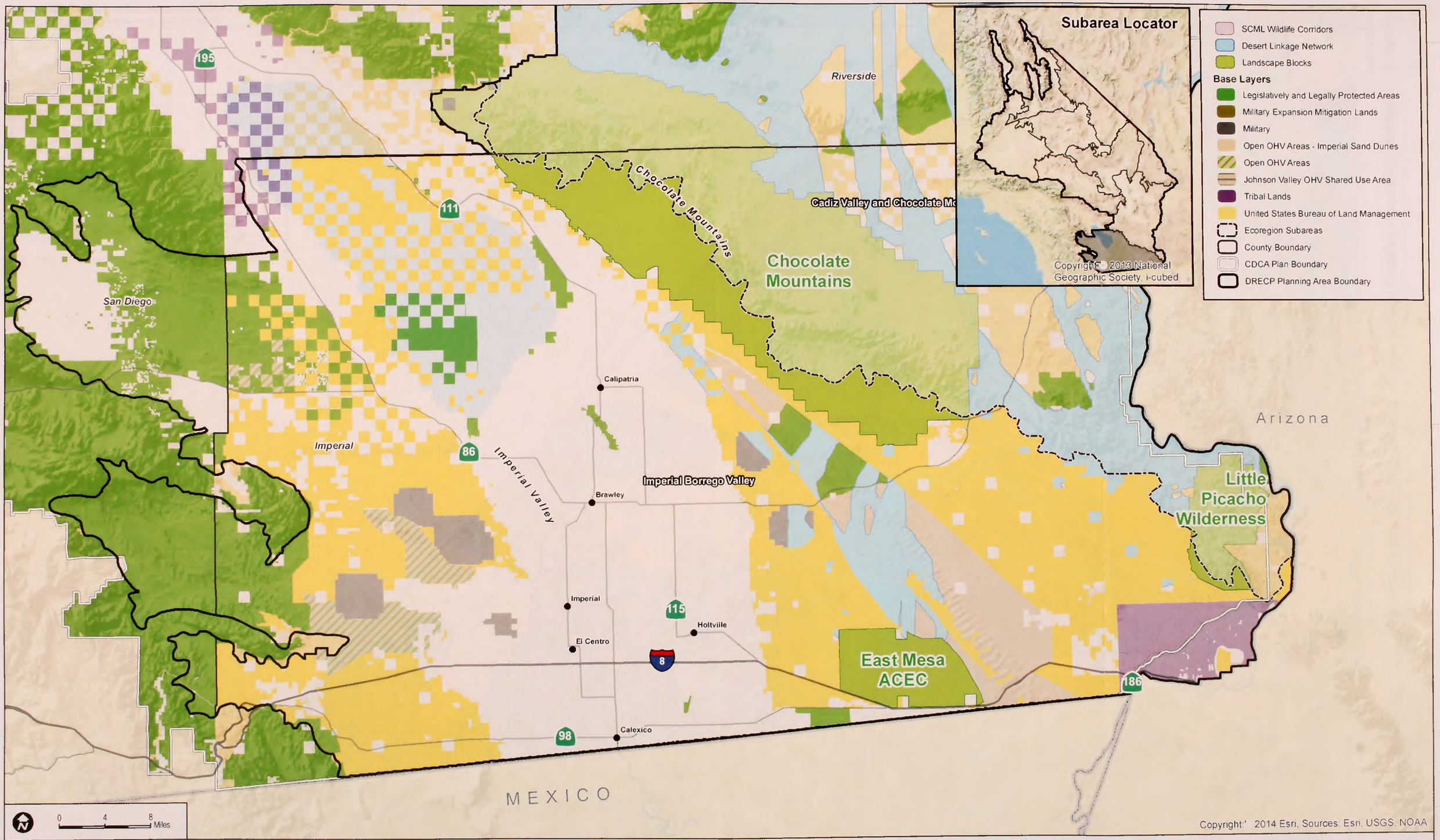
FIGURE III.7-27

Habitat Linkages and Wildlife Movement Corridors - Cadiz Valley and Chocolate Mountains Ecoregion Subarea

DRECP Proposed LUPA and Final EIS

October 2015

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Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); South Coast Wildlands (2012)

FIGURE III.7-28

Habitat Linkages and Wildlife Movement Corridors - Imperial Borrego Valley Ecoregion Subarea

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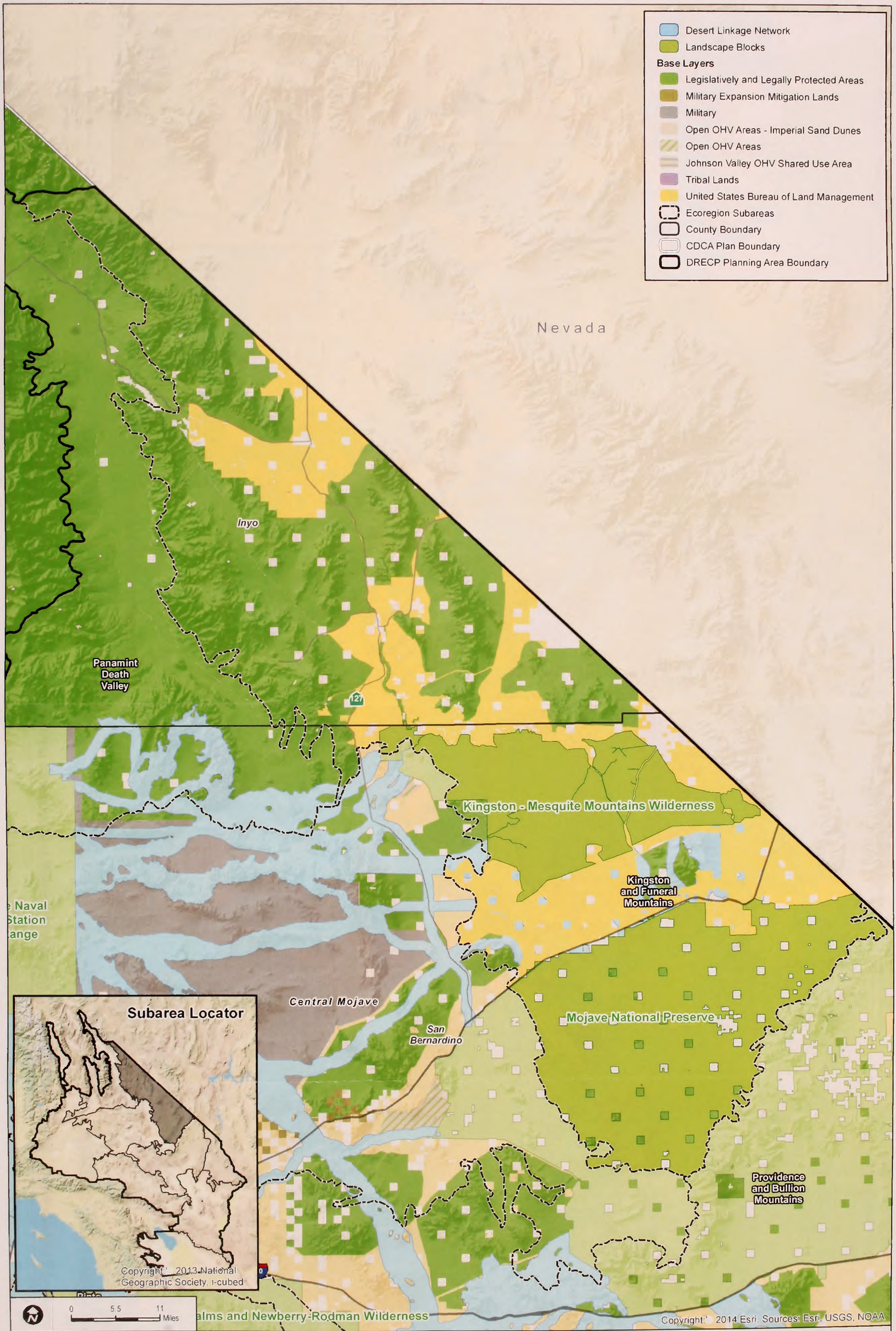
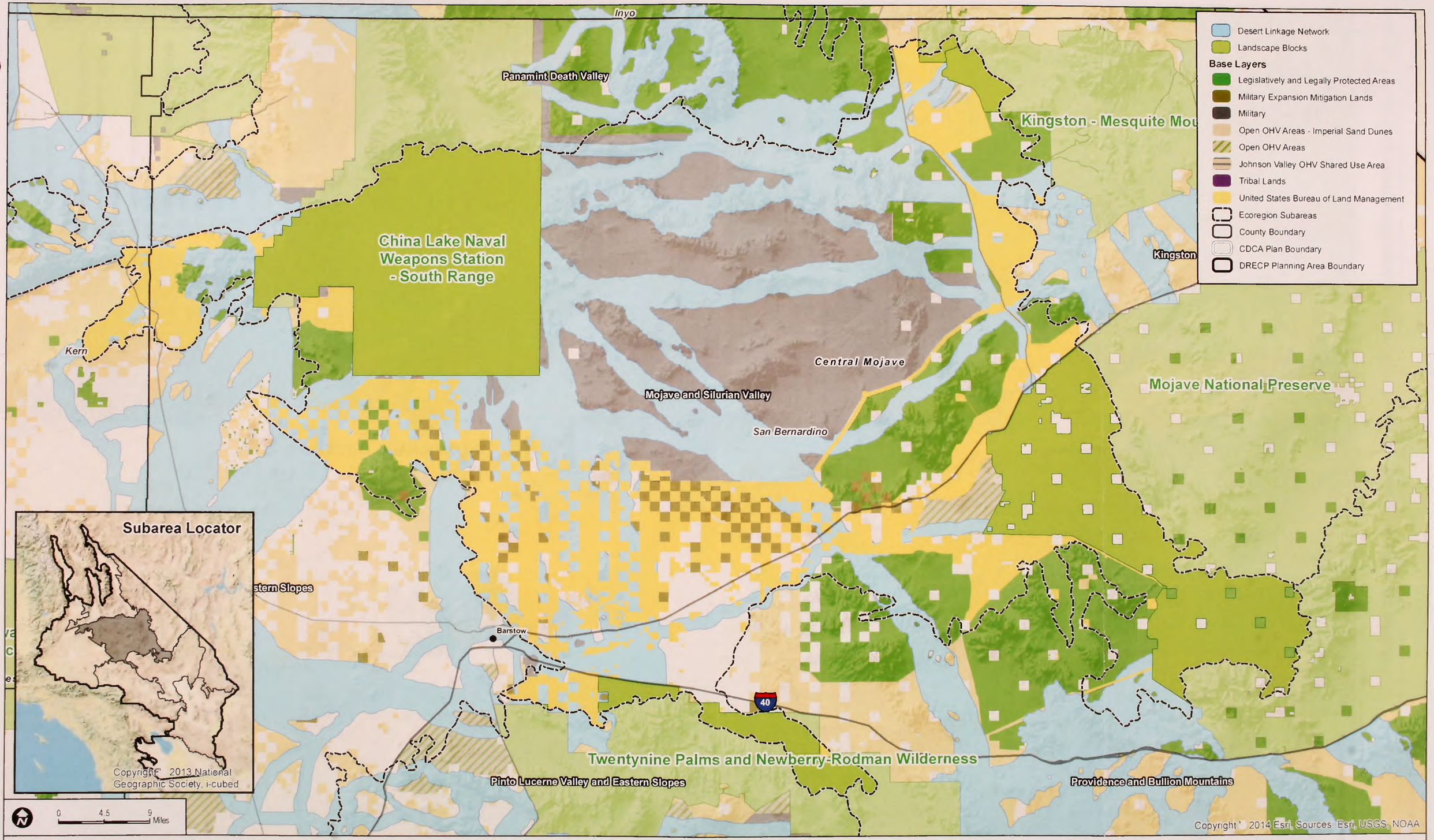


FIGURE III.7-29

Habitat Linkages and Wildlife Movement Corridors - Kingston and Funeral Mountains Ecoregion Subarea

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Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); South Coast Wildlands (2012)

FIGURE III.7-30

Habitat Linkages and Wildlife Movement Corridors - Mojave and Silurian Valley Ecoregion Subarea

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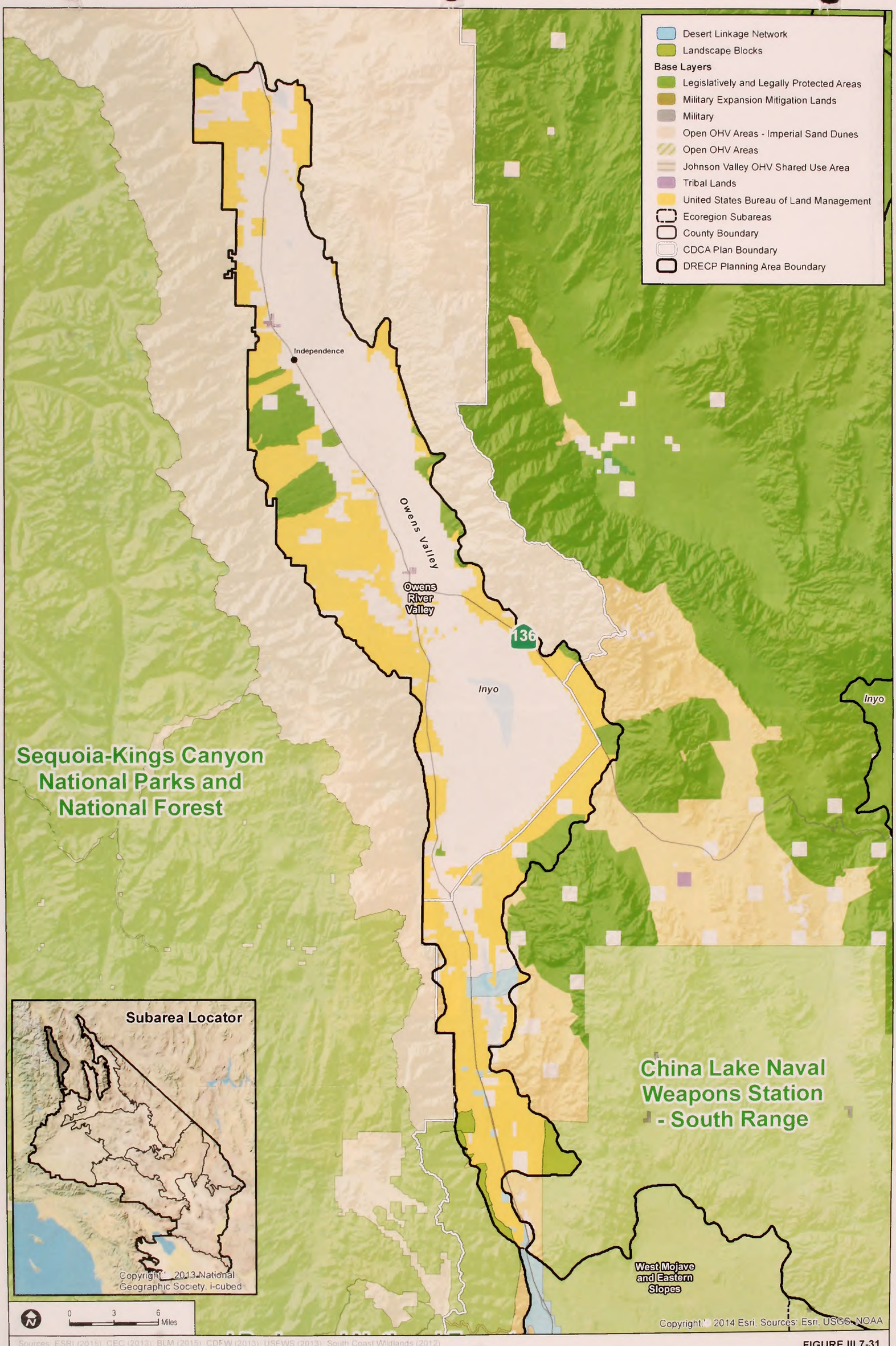


FIGURE III.7-31

Habitat Linkages and Wildlife Movement Corridors - Owens River Valley Ecoregion Subarea

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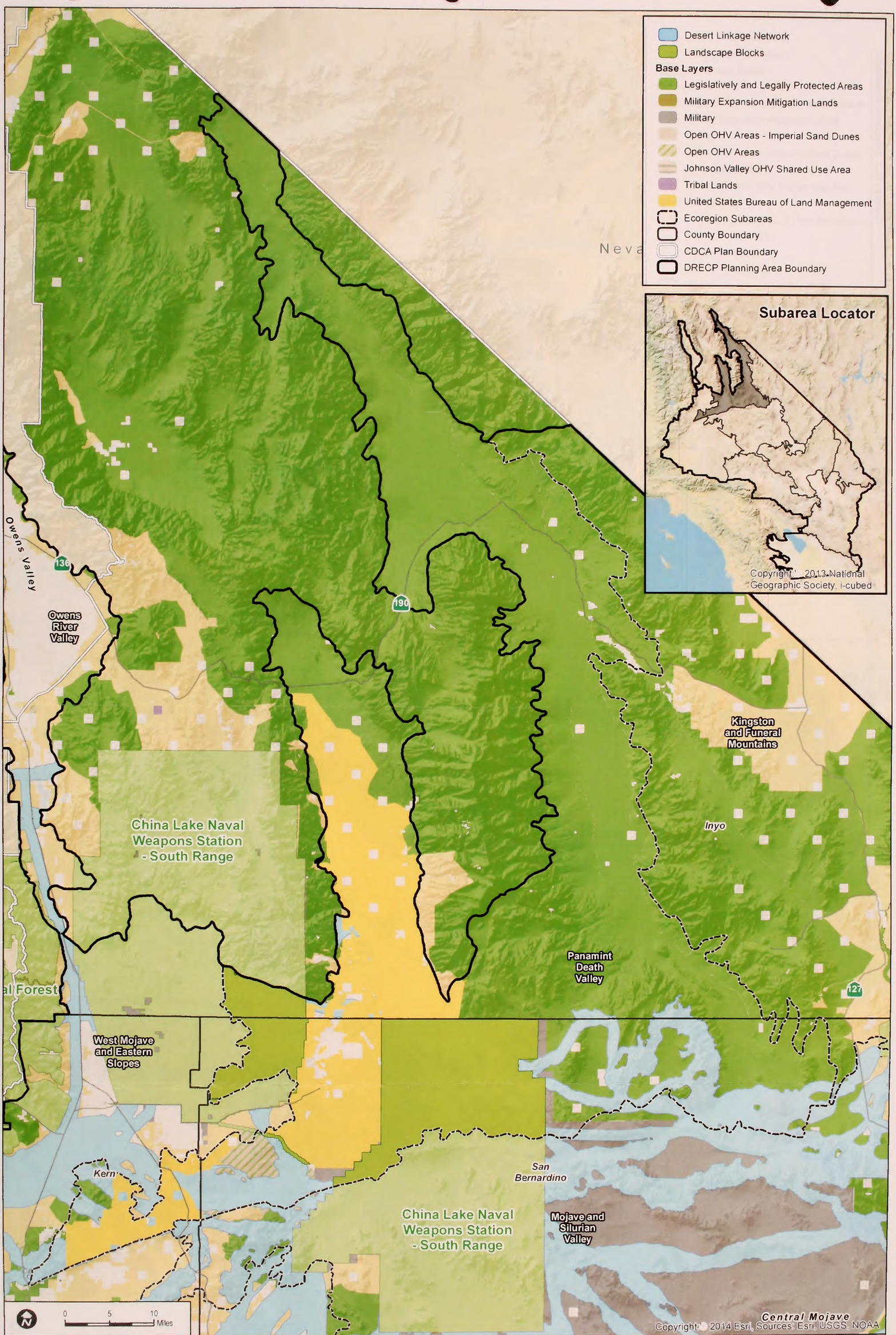


FIGURE III.7-32

Habitat Linkages and Wildlife Movement Corridors - Panamint Death Valley Ecoregion Subarea

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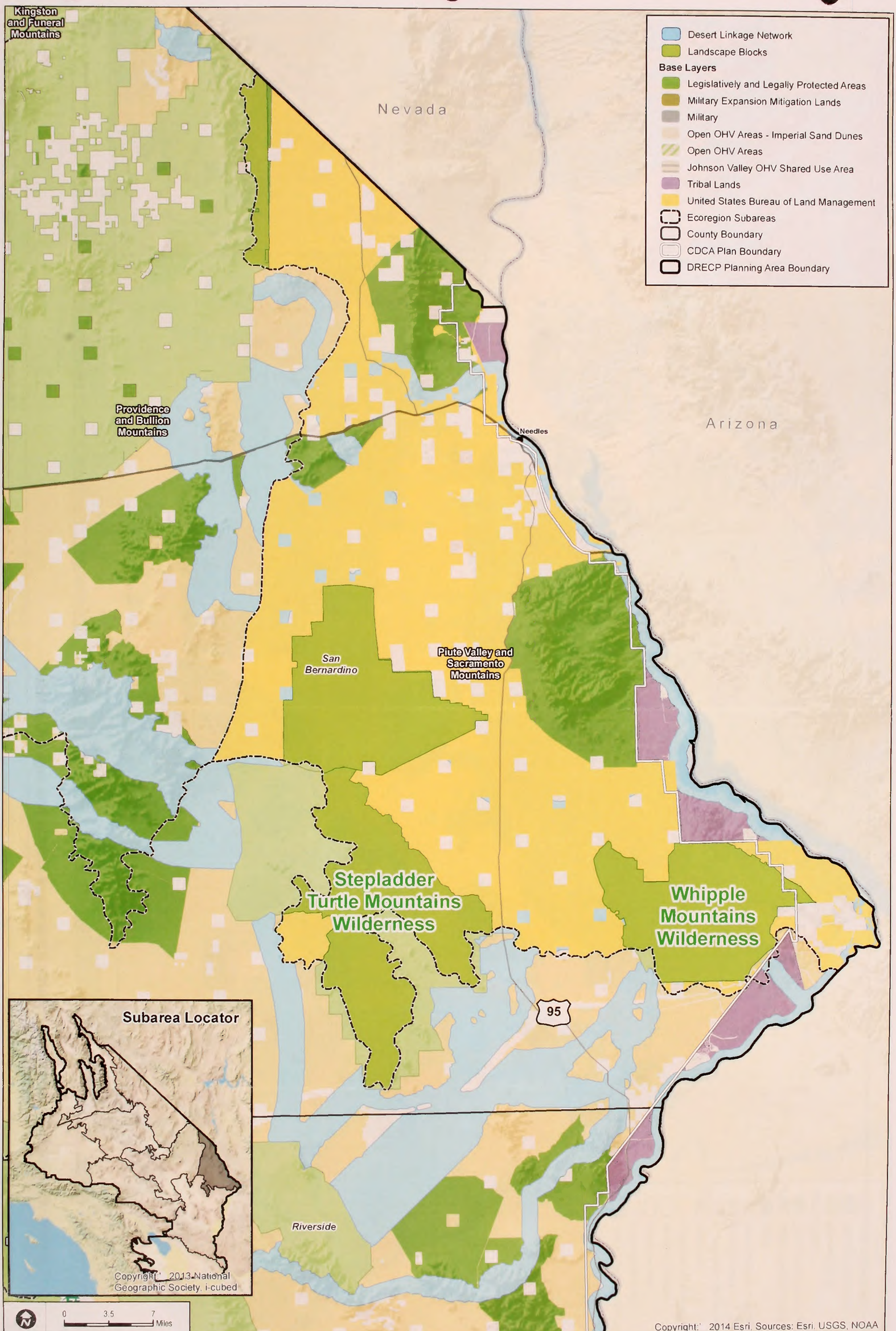


Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); South Coast Wildlands (2012)

FIGURE III.7-33

Habitat Linkages and Wildlife Movement Corridors - Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

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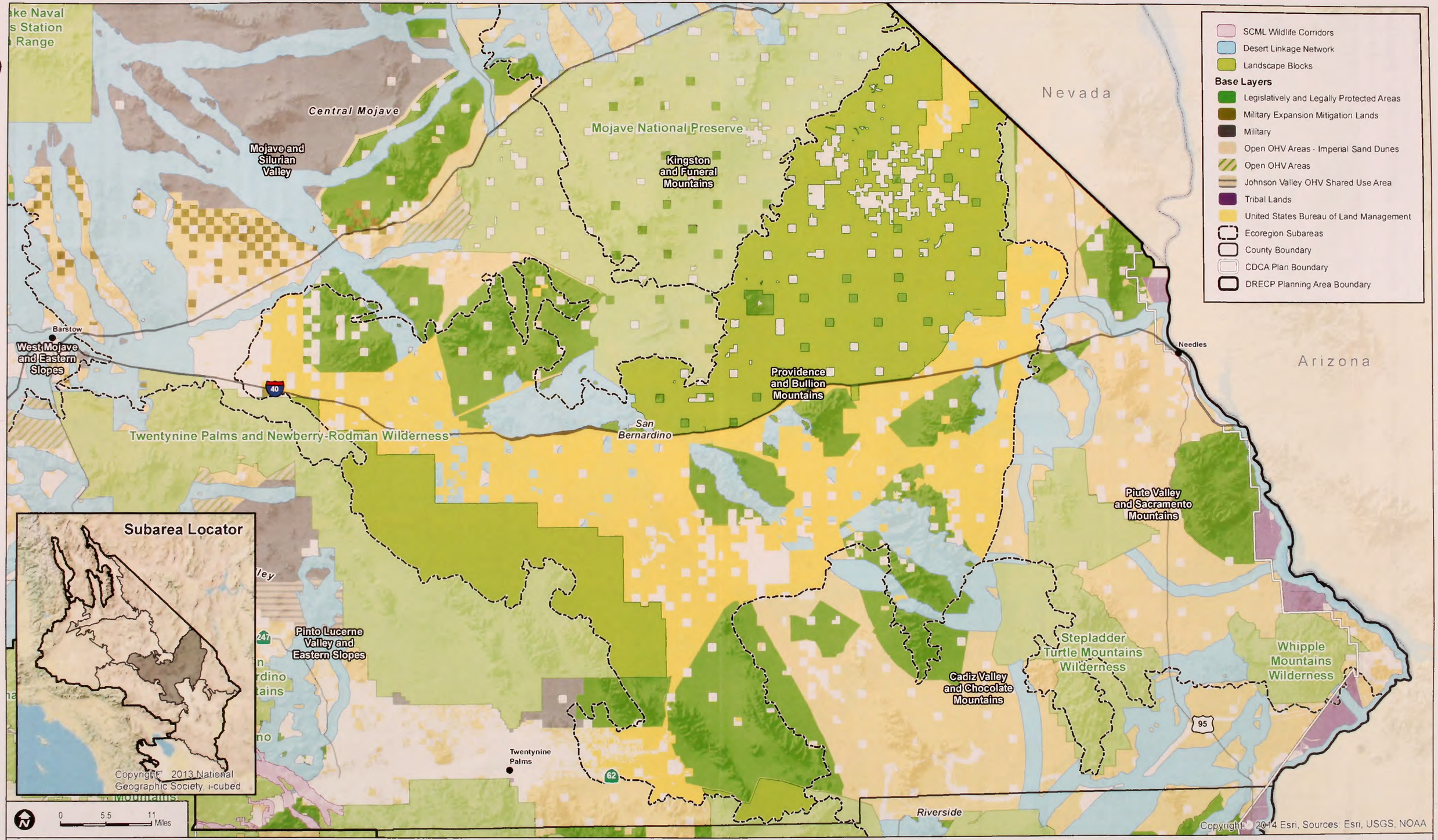


Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2015); South Coast Wildlands (2012)

FIGURE III.7-34

Habitat Linkages and Wildlife Movement Corridors - Piute Valley and Sacramento Mountains Ecoregion Subarea

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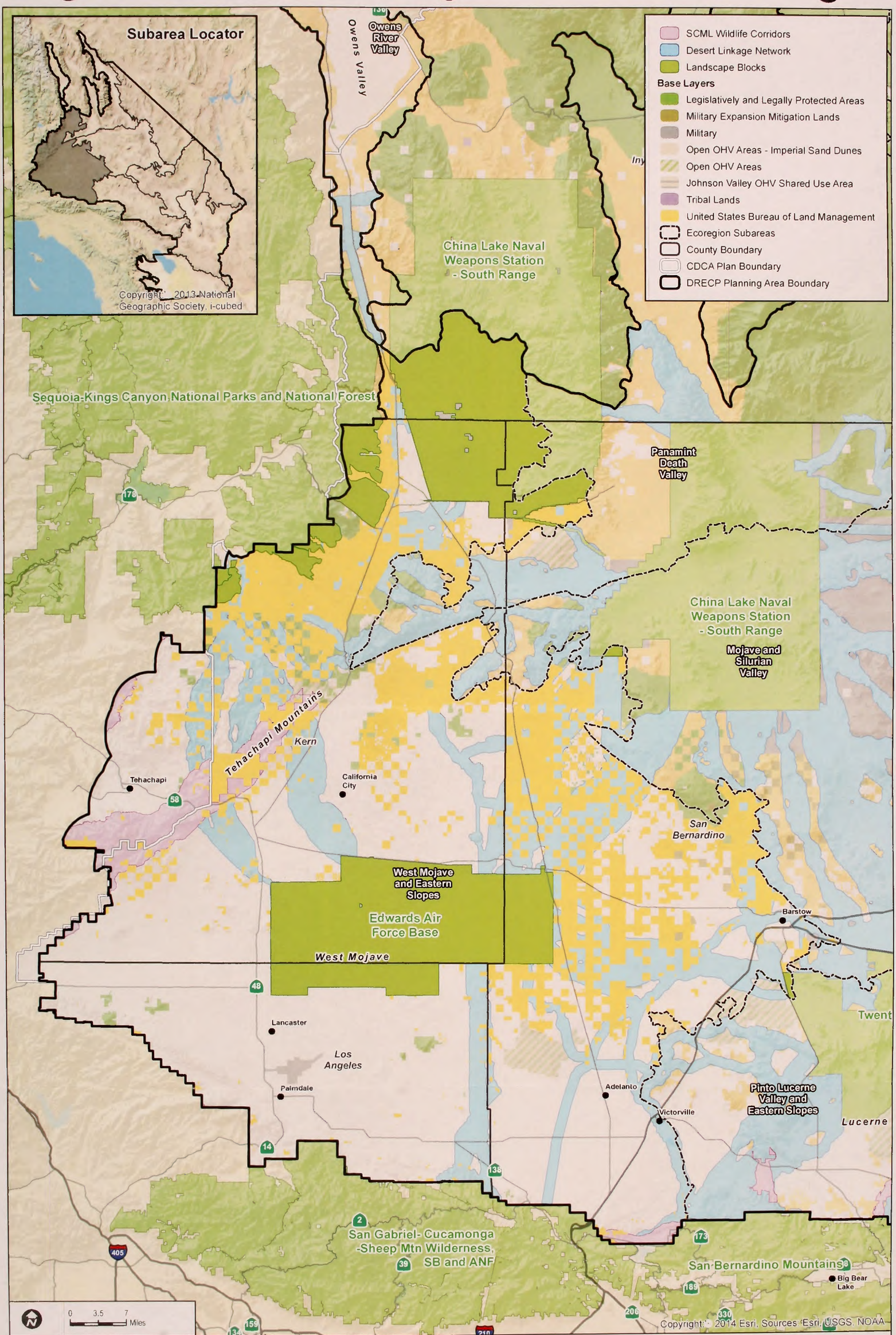


Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); South Coast Wildlands (2012)

FIGURE III.7-35

Habitat Linkages and Wildlife Movement Corridor - Providence and Bullion Mountains Ecoregion Subarea

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Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); South Coast Wildlands (2012)

FIGURE III.7-36

Habitat Linkages and Wildlife Movement Corridors - West Mojave and Eastern Slopes Ecoregion Subarea

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Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

As shown on Figure III.7-33, landscape habitat linkages cover approximately 327,000 acres within the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea. These linkages are primarily located in the valleys, providing connectivity between mountain ranges within the ecoregion subarea. Specific linkages in this ecoregion subarea include the following: China Lake South Range–Twentynine Palms and Newberry Rodman, EAFB–Twentynine Palms and Newberry Rodman, Twentynine Palms and Newberry Rodman–San Bernardino Mountains, and Twentynine Palms and Newberry Rodman–San Gabriel Mountains (Penrod et al. 2012).

Piute Valley and Sacramento Mountains Ecoregion Subarea

As shown on Figure III.7-34, landscape habitat linkages cover approximately 161,000 acres within the Piute Valley and Sacramento Mountains ecoregion subarea. These linkages provide connectivity between the interior corridors and the Colorado River. The linkages are primarily part of the larger Mojave National Preserve–Stepladder Turtle Mountains linkage (Penrod et al. 2012).

Providence and Bullion Mountains Ecoregion Subarea

As shown on Figure III.7-35, landscape habitat linkages cover approximately 428,000 acres within the Providence and Bullion Mountains ecoregion subarea. These linkages are primarily located in the valleys, providing connectivity between mountain ranges within the ecoregion subarea. Specific linkages in this ecoregion subarea include the Mojave National Preserve–Twentynine Palms and Newberry Rodman and Mojave National Preserve–Stepladder Turtle Mountains linkages (Penrod et al. 2012).

West Mojave and Eastern Slopes Ecoregion Subarea

As shown on Figure III.7-36, landscape habitat linkages cover approximately 880,000 acres within the West Mojave and Eastern Slopes ecoregion subarea. These linkages are primarily located in the valleys, providing connectivity between mountain ranges within the ecoregion subarea and linking the Owens River Valley and Antelope Valley to the larger DRECP Plan Area. Specific linkages in this ecoregion subarea include the following: China Lake South Range–EAFB, China Lake South Range–Sierra Nevada, China Lake South Range–Twentynine Palms and Newberry Rodman, EAFB–Sierra Nevada, China Lake North Range–China Lake South Range, EAFB–Twentynine Palms and Newberry Rodman, China Lake North Range–Sierra Nevada, and EAFB–San Gabriel Mountains (Penrod et al. 2012).

III.7.9 Bureau of Land Management Land Use Plan Amendment

Tables III.7-70 through III.7-82 provide a summary of the biological resources in the BLM Land Use Plan Amendment (LUPA) portion of the DRECP Plan Area. The LUPA portion of the DRECP Plan Area includes BLM-administered lands within the DRECP Plan Area also within the California Desert Conservation Area (CDCA) boundary or within the boundary of the BLM Resource Management Plans (RMPs). See the sections earlier in this chapter for a description of these resources.

Table III.7-70
Landforms within the BLM LUPA in the DRECP Plan Area

Landform	Acres
Canyons, deeply incised streams	545,000
Mountain tops, high ridges	620,000
Open slopes	1,645,000
Plains	7,106,000
Total	**9,916,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Table III.7-71
National Hydrography Dataset Waterbodies within the BLM LUPA in the DRECP Plan Area

NHD Waterbody	Acres
Intermittent lake/pond	1,000
Perennial lake/pond	300
Playa	167,000
Reservoir	10,000
Swamp/marsh	400
Total	**179,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Table III.7-72
Seeps/Springs within the BLM LUPA in the DRECP Plan Area

Ecoregion Subarea	Count of Seeps/Springs
Cadiz Valley and Chocolate Mountains	5
Imperial Borrego Valley	7
Kingston and Funeral Mountains	45
Mojave and Silurian Valley	11
Owens River Valley	21
Panamint Death Valley	14
Pinto Lucerne Valley and Eastern Slopes	65
Piute Valley and Sacramento Mountains	22
Providence and Bullion Mountains	22
West Mojave and Eastern Slopes	56
Total	**268**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Table III.7-73
Major Rivers within the BLM LUPA in the DRECP Plan Area

NHD Major River	Length (feet)
Amargosa River	306,000
Mojave River	147,000
Total	**454,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Table III.7-74
Regional Geology within the BLM LUPA in the DRECP Plan Area

Parent Material	Acres
Gabbroic	28,000
Granitic	1,276,000
Granitic and metamorphic	75,000
Igneous and metamorphic	270,000
Metavolcanic	214,000
Mixed rock	93,000
Sand dune	444,000

Table III.7-74
Regional Geology within the BLM LUPA in the DRECP Plan Area

Parent Material	Acres
Sedimentary	6,283,000
Sedimentary and metasedimentary	556,000
Volcanic	679,000
Water	500
Total	**9,917,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Table III.7-75
Dunes and Sand Resources by Ecoregion Subarea within the BLM LUPA in the DRECP Plan Area

Ecoregion Subarea	Total in the DRECP Plan Area
Cadiz Valley and Chocolate Mountains	525,000
Imperial Borrego Valley	224,000
Kingston and Funeral Mountains	44,000
Mojave and Silurian Valley	55,000
Owens River Valley	5,000
Panamint Death Valley	31,000
Pinto Lucerne Valley and Eastern Slopes	19,000
Piute Valley and Sacramento Mountains	60
Providence and Bullion Mountains	187,000
West Mojave and Eastern Slopes	9,000
Total	**1,098,000**

Sources: California Department of Conservation 2000; Dean 1978; and CDFG 2012a.
Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Table III.7-76
Distribution of Elevation Ranges in the BLM LUPA

Elevation Range (feet AMSL)	Acres
Less than 0	75,000
0–500	805,000

Table III.7-76
Distribution of Elevation Ranges in the BLM LUPA

Elevation Range (feet AMSL)	Acres
500–1,000	1,514,000
1,000–1,500	1,346,000
1,500–2,000	1,315,000
2,000–2,500	1,365,000
2,500–3,000	1,278,000
3,000–3,500	937,000
3,500–4,000	599,000
4,000–4,500	346,000
4,500–5,000	170,000
5,000–5,500	95,000
5,500–6,000	50,000
6,000–6,500	15,000
6,500–7,000	5,000
7,000–7,500	2,000
7,500–8,000	600
8,000–8,500	200
Total	**9,916,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Table III.7-77
Distribution of Slope Ranges in the BLM LUPA

Slope (degrees)	Acres	% of Total
0–5	5,866,000	59.2%
5–10	1,613,000	16.3%
10–15	665,000	6.7%
15–20	455,000	4.6%
20–25	349,000	3.5%
25–30	271,000	2.7%
30–35	210,000	2.1%
35–40	160,000	1.6%
40–45	117,000	1.2%
45–50	81,000	0.8%

Table III.7-77
Distribution of Slope Ranges in the BLM LUPA

Slope (degrees)	Acres	% of Total
50–100	131,000	1.3%
Above 100	400	0.0%
Total	**9,917,000**	**100.0%**

Source: USGS 2007.
Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Table III.7-78
Distribution of Aspect in the BLM LUPA

Aspect	Acres	% of Total
Flat	36,000	0.4%
North	1,065,000	10.7%
Northeast	1,546,000	15.6%
East	1,411,000	14.2%
Southeast	1,207,000	12.2%
South	1,171,000	11.8%
Southwest	1,434,000	14.5%
West	1,155,000	11.7%
Northwest	891,000	9.0%
Total	**9,917,000**	**100.0%**

Source: USGS 2007.
Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Table III.7-79
Summary of Vegetation Types and Other Land Cover in the BLM LUPA

GENERAL VEGETATION GROUPS Vegetation Alliance[1]	Rarity Ranking[2]	Acres[3]
California Forest And Woodland Vegetation Types		**44,000**
Californian broadleaf forest and woodland	—	**11,000**
Californian broadleaf forest and woodland[3]	—	11,000
Californian montane conifer forest	—	**34,000**
Californian montane conifer forest[3]	—	34,000

Table III.7-79
Summary of Vegetation Types and Other Land Cover in the BLM LUPA

GENERAL VEGETATION GROUPS Vegetation Alliance[1]	Rarity Ranking[2]	Acres[3]
Chaparral And Coastal Scrub (Cismontane Scrub) Vegetation Types		**19,000**
Californian mesic chaparral	—	**500**
Californian mesic chaparral[3]	—	300
Cercocarpus montanus	S4	100
Prunus ilicifolia	S3	20
Quercus berberidifolia	S4	<10
Quercus berberidifolia–Adenostoma fasciculatum	S4	50
Californian pre-montane chaparral	—	**300**
Californian pre-montane chaparral[3]	—	300
Arctostaphylos glandulosa	S4	10
Californian xeric chaparral	—	**5,000**
Californian xeric chaparral[3]	—	3,000
Adenostoma fasciculatum	S5	2,000
Fremontodendron californicum	S4	<10
Central and south coastal California seral scrub	—	**20**
Eriodictyon (crassifolium, trichocalyx)	S4	20
Central and south coastal Californian coastal sage scrub	—	**13,000**
Central and south coastal Californian coastal sage scrub[3]	—	20
Eriogonum fasciculatum	S5	13,000
Western Mojave and Western Sonoran Desert borderland chaparral	—	**200**
Western Mojave and Western Sonoran Desert borderland chaparral[3]	—	50
Quercus cornelius-mulleri	S4	100
Quercus john-tuckeri	S4	50
Desert Conifer Woodland Vegetation Types		**50,000**
Great Basin pinyon–juniper woodland	—	**50,000**
Great Basin pinyon–juniper woodland[3]	—	39,000
Cercocarpus ledifolius	S4	<10
Juniperus californica (non-LRO)	S4	4,000
Juniperus californica (LRO)	S4	400
Pinus monophylla	S4	6,000
Desert Outcrop and Badland Vegetation Types		**1,219,000**
North American warm desert bedrock cliff and outcrop	—	**1,219,000**
North American warm desert bedrock cliff and outcrop[3]	—	1,071,000
Atriplex hymenelytra (non-LRO)	S4	15,000
Atriplex hymenelytra (LRO)	S4	200
Chorizanthe rigida–Geraea canescens	S4	134,000

Table III.7-79
Summary of Vegetation Types and Other Land Cover in the BLM LUPA

GENERAL VEGETATION GROUPS Vegetation Alliance[1]	Rarity Ranking[2]	Acres[3]
Peucephyllum schottii	S3	100
Desert Scrub Vegetation Types		**7,293,000**
Arizonan upland Sonoran desert scrub	—	**3,000**
Arizonan upland Sonoran desert scrub[3]	—	2,000
Agave deserti	S3	100
Tetracoccus hallii	S1	<10
Viguiera parishii	S4	1,000
Intermontane deep or well-drained soil scrub	—	**70,000**
Ephedra nevadensis (non-LRO)	S4	3,000
Ephedra nevadensis (LRO)	S4	10
Ephedra viridis	S4	11,000
Ericameria teretifolia	S4	3,000
Grayia spinosa	S4	43,000
Krascheninnikovia lanata	S3	5,000
Lycium cooperi	S3?	300
Purshia tridentata	S3	500
Intermontane seral shrubland	—	**6,000**
Intermontane seral shrubland[3]	—	800
Encelia (actoni, virginesis)	S3	4,000
Ericameria cooperi	S4?	700
Ericameria nauseosa	S5	200
Gutierrezia sarothrae	S3	90
Intermountain dry shrubland and grassland	—	**284,000**
Intermountain dry shrubland and grassland[3]	—	284,000
Intermountain mountain big sagebrush shrubland and steppe	—	**24,000**
Intermountain mountain big sagebrush shrubland and steppe[3]	—	22,000
Artemisia tridentata	S5	<10
Intermountain West mesic tall sagebrush shrubland and steppe	—	3,000
Lower bajada and fan Mojavean–Sonoran desert scrub	—	**6,398,000**
Lower bajada and fan Mojavean–Sonoran desert scrub[3]	—	4,348,000
Ambrosia dumosa	S5	57,000
Atriplex polycarpa	S4	58,000
Encelia farinosa	S4	50,000
Fouquieria splendens	S3	50
Larrea tridentata	S5	229,000
Larrea tridentata–Ambrosia dumosa	S5	1,405,000

Table III.7-79
Summary of Vegetation Types and Other Land Cover in the BLM LUPA

GENERAL VEGETATION GROUPS Vegetation Alliance[1]	Rarity Ranking[2]	Acres[3]
Larrea tridentata–Encelia farinosa	S4	238,000
Mojave and Great Basin upper bajada and toeslope	—	**416,000**
Mojave and Great Basin upper bajada and toeslope[3]	—	302,000
Coleogyne ramosissima (non-LRO)	S4	17,000
Coleogyne ramosissima (LRO)	S4	13,000
Menodora spinescens	S3	100
Salazaria mexicana	S4	30,000
Yucca brevifolia	S3	17,000
Yucca schidigera	S4	38,000
Shadscale–saltbush cool semi-desert scrub	—	**105,000**
Shadscale–saltbush cool semi-desert scrub[3]	—	74,000
Atriplex canescens	S4	9,000
Atriplex confertifolia	S4	22,000
Southern Great Basin semi-desert grassland	—	**50**
Southern Great Basin semi-desert grassland[3]	—	<10
Achnatherum speciosum	S2	50
Dune Vegetation Types		**237,000**
North American warm desert dunes and sand flats	—	**237,000**
North American warm desert dunes and sand flats[3]	—	194,000
Dicoria canescens–Abronia villosa	S3	4,000
Panicum urvilleanum	S1	400
Pleuraphis rigida	S2	3,000
Prosopis glandulosa coppice dunes	S3?	33,000
Wislizenia refracta	S2	3,000
Grassland Vegetation Types		**30,000**
California annual and perennial grassland	—	**28,000**
California annual and perennial grassland[3]	—	20,000
Brassica nigra and other mustards	—	1,000
California annual and perennial grassland (native component) Mapping Unit (non-LRO)	—	2,000
California annual and perennial grassland (native component) Mapping Unit (LRO)	—	3,000
Mediterranean California naturalized annual and perennial grassland	—	3,000
California annual forb/grass vegetation	—	**1,000**
California annual forb/grass vegetation[3]	—	1,000
Amsinckia (menziesii, tessellata)	S4	200

Table III.7-79
Summary of Vegetation Types and Other Land Cover in the BLM LUPA

GENERAL VEGETATION GROUPS Vegetation Alliance[1]	Rarity Ranking[2]	Acres[3]
Riparian Vegetation Types		**669,000**
Madrean warm semi-desert wash woodland/scrub	—	**524,000**
Madrean warm semi-desert wash woodland/scrub[3]	—	524,000
Mojavean semi-desert wash scrub	—	**11,000**
Mojavean semi-desert wash scrub[3]	—	300
Ambrosia salsola	S4	7,000
Bebbia juncea	S3?	<10
Brickellia incana	S2?	100
Ephedra californica	S3	2,000
Ericameria paniculata	S3	1,000
Lepidospartum squamatum	S3	1,000
Prunus fasciculata	S3	300
Sonoran–Coloradan semi-desert wash woodland/scrub	—	**122,000**
Sonoran–Coloradan semi-desert wash woodland/scrub[3]	—	1,000
Acacia greggii	S4	5,000
Chilopsis linearis	S3	1,000
Hyptis emoryi	S3	3,000
Parkinsonia florida–Olneya tesota	S4	106,000
Pluchea sericea	S3	<10
Prosopis glandulosa	S3	5,000
Psorothamnus spinosus	S3	2,000
Southwestern North American riparian evergreen and deciduous woodland	—	**400**
Southwestern North American riparian evergreen and deciduous woodland[3]	—	400
Populus fremontii	S3	30
Salix laevigata	S3	<10
Southwestern North American riparian/wash scrub	—	**11,000**
Southwestern North American riparian/wash scrub[3]	—	90
Baccharis sergiloides	S3	<10
Forestiera pubescens	S2	<10
Salix exigua	S4	<10
Salix lasiolepis	S4	<10
Southwestern North American introduced riparian scrub	—	10,000
Tamarix spp.	—	700

Table III.7-79
Summary of Vegetation Types and Other Land Cover in the BLM LUPA

GENERAL VEGETATION GROUPS Vegetation Alliance[1]	Rarity Ranking[2]	Acres[3]
Wetland Vegetation Types		**300,000**
Arid West freshwater emergent marsh	—	**10**
Arid West freshwater emergent marsh[3]	—	10
Californian warm temperate marsh/seep	—	**<10**
Juncus arcticus (var. *balticus, mexicanus*)	S4	<10
North American warm desert alkaline scrub and herb playa and wet flat	—	**151,000**
North American warm desert alkaline scrub and herb playa and wet flat[3]	—	151,000
Open water[4]	—	**1,000**
Playa[4]	—	**26,000**
Southwestern North American salt basin and high marsh	—	**123,000**
Southwestern North American salt basin and high marsh[3]	—	47,000
Allenrolfea occidentalis	S3	1,000
Atriplex lentiformis	S4	10
Atriplex spinifera	S4	60,000
Distichlis spicata	S4	10
Isocoma acradenia	S2?	<10
Suaeda moquinii	S4	14,000
Southwestern North American alkali marsh/seep vegetation	—	20
Lacustrine[4]	—	100
Other Land Covers		**56,000**
Agriculture	—	6,000
Developed and Disturbed Areas	—	47,000
Not Mapped	—	3,000
	Total	**9,917,000**

1 Only a portion of the DRECP Plan Area, approximately six million acres of the Mojave and Colorado/Sonoran deserts within Inyo, Kern, Los Angeles, San Bernardino, Riverside, and Imperial counties, has been mapped at the more specific alliance level.

2 State Rankings: S1 = critically imperiled; S2 = imperiled; S3 = vulnerable; S4 = apparently secure; S5 = secure; ? = inexact numeric rank (NatureServe 2012); LRO = Locally Rare Occurrence. Those in bold typeface are considered rare in the context of the DRECP.

3 Where the alliance name is the same as the vegetation group name the vegetation type is undifferentiated and not described at the alliance level.

4 This is a land cover type and not specifically a "vegetation type."

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Table III.7-80
Focus Species with Occurrences within the BLM LUPA in the DRECP Plan Area

Taxa	Common Name	Scientific Name	Federal Status[1]	State Status[2]
Amphibian/ reptile	Agassiz's desert tortoise	*Gopherus agassizii*	FT	ST
	Flat-tailed horned lizard	*Phrynosoma mcallii*	BLM/FS	SC/CSC
	Mojave fringe-toed lizard	*Uma scoparia*	BLM	CSC
	Tehachapi slender salamander	*Batrachoseps stebbinsi*	BLM/FS	ST
Bird	Bendire's thrasher	*Toxostoma bendirei*	BCC/BLM	CSC
	Burrowing owl	*Athene cunicularia*	BCC/BLM	CSC
	California black rail	*Laterallus jamaicensis coturniculus*	BCC/BLM	ST
	Gila woodpecker	*Melanerpes uropygialis*	BLM/BCC	SE
	Golden eagle	*Aquila chrysaetos*	BLM	FP
	Least Bell's vireo	*Vireo bellii pusillus*	FE/BCC	SE
	Mountain plover	*Charadrius montanus*	BCC/BLM	CSC
	Swainson's hawk	*Buteo swainsoni*	BLM/FS	ST
	Tricolored blackbird	*Agelaius tricolor*	BLM/BCC	SE
	Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	FT/FS/BCC/ BLM	SE
	Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus)*	Southwestern: FE	SE
	Yuma Ridgway's rail	*Rallus obsoletus yumanensis*	FE/BCC	ST/FP
Fish	Desert pupfish	*Cyprinodon macularius*	FE	SE
	Mohave tui chub	*Siphateles (Gila) bicolor mohavensis*	FE	SE/FP
Mammal	Desert bighorn sheep	*Ovis canadensis nelsoni*	Desert: BLM	Desert: FP[3]
	California leaf-nosed bat	*Macrotus californicus*	BLM/FS	CSC
	Mohave ground squirrel	*Xerospermophilus mohavensis*	BLM	ST
	Pallid bat	*Antrozous pallidus*	BLM/FS	CSC
	Townsend's big-eared bat	*Corynorhinus townsendii*	BLM/FS	SC/CSC
Plant	Alkali mariposa-lily	*Calochortus striatus*	BLM	(CRPR 1B.2)
	Barstow woolly sunflower	*Eriophyllum mohavense*	BLM	(CRPR 1B.2)

Table III.7-80
Focus Species with Occurrences within the BLM LUPA in the DRECP Plan Area

Taxa	Common Name	Scientific Name	Federal Status[1]	State Status[2]
	Desert cymopterus	*Cymopterus deserticola*	BLM	(CRPR 1B.2)
	Little San Bernardino Mountains linanthus	*Linanthus maculatus*	BLM	(CRPR 1B.2)
	Mojave monkeyflower	*Mimulus mohavensis*	BLM	(CRPR 1B.2)
	Mojave tarplant	*Deinandra mohavensis*	BLM	SE (CRPR 1B.3)
	Owens Valley checkerbloom	*Sidalcea covillei*	BLM	SE (CRPR 1B.1)
	Parish's daisy	*Erigeron parishii*	FT	(CRPR 1B.1)
	Triple-ribbed milk-vetch	*Astragalus tricarinatus*	FE	(CRPR 1B.2)

1 Federal Status – FE: Federally Endangered; FT: Federally Threatened; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern.

2 State Status – SE: California Endangered; ST: California Threatened; SC: Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected. CRPR: California Rare Plant Rank (formerly known as the CNPS List)–CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere.

3 Limited hunting allowed.

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Table III.7-81
Focus and Planning Species' Modeled Habitat within BLM LUPA

Common Name	Scientific Name	Acres (% of BLM LUPA)
Focus Species		
Amphibians/Reptiles		
Agassiz's desert tortoise	*Gopherus agassizii*	6,043,800 (61%)
Flat-tailed horned lizard	*Phrynosoma mcallii*	534,000 (5%)
Mojave fringe-toed lizard	*Uma scoparia*	748,000 (8%)
Tehachapi slender salamander	*Batrachoseps stebbinsi*	7,000 (0.1%)
Birds		
Bendire's thrasher	*Toxostoma bendirei*	785,000 (8%)
Burrowing owl	*Athene cunicularia*	1,905,000 (19%)
California black rail	*Laterallus jamaicensis coturniculus*	33,000 (0.3%)
California condor	*Gymnogyps californianus*	250,000 (3%)
Gila woodpecker	*Melanerpes uropygialis*	38,000 (0.4%)

Table III.7-81
Focus and Planning Species' Modeled Habitat within BLM LUPA

Common Name	Scientific Name	Acres (% of BLM LUPA)
Golden eagle – foraging	*Aquila chrysaetos*	4,080,000 (41%)
Golden eagle – nesting	*Aquila chrysaetos*	2,466,000 (25%)
Greater sandhill crane	*Grus canadensis tabida*	3,000 (0.03%)
Least Bell's vireo	*Vireo bellii pusillus*	70,000 (1%)
Mountain plover	*Charadrius montanus*	8,000 (0.1%)
Swainson's hawk	*Buteo swainsoni*	116,000 (1%)
Tricolored blackbird	*Agelaius tricolor*	14,000 (0.1%)
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	22,000 (0.2%)
Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus*)	46,000 (0.5%)
Yuma Ridgway's rail	*Rallus obsoletus yumanensis*	6,000 (0.1%)
Fish		
Desert pupfish	*Cyprinodon macularius*	500 (0.01%)
Owens pupfish	*Cyprinodon radiosus*	4,000 (0.04%)
Owens tui chub	*Siphateles (Gila) bicolor snyderi*	4,000 (0.04%)
Mammals		
Desert bighorn sheep	*Ovis canadensis nelsoni*	Intermountain: 2,412,000 (24%); Mountain: 3,634,000 (37%)
California leaf-nosed bat	*Macrotus californicus*	4,500,000 (45%)
Mohave ground squirrel	*Xerospermophilus mohavensis*	1,083,000 (11%)
Pallid bat	*Antrozous pallidus*	9,272,000 (93%)
Townsend's big-eared bat	*Corynorhinus townsendii*	7,903,000 (80%)
Plants		
Alkali mariposa-lily	*Calochortus striatus*	2,000 (0.02%)
Bakersfield cactus	*Opuntia basilaris* var. *treleasei*	79,000 (1%)
Barstow woolly sunflower	*Eriophyllum mohavense*	72,000 (1%)
Desert cymopterus	*Cymopterus deserticola*	67,000 (1%)
Little San Bernardino Mountains linanthus	*Linanthus maculatus*	83,000 (1%)
Mojave monkeyflower	*Mimulus mohavensis*	128,000 (1%)
Mojave tarplant	*Deinandra mohavensis*	139,000 (1%)
Owens Valley checkerbloom	*Sidalcea covillei*	55,000 (1%)
Parish's daisy	*Erigeron parishii*	85,000 (1%)
Triple-ribbed milk-vetch	*Astragalus tricarinatus*	4,000 (0.04%)

Table III.7-81
Focus and Planning Species' Modeled Habitat within BLM LUPA

Common Name	Scientific Name	Acres (% of BLM LUPA)
Planning Species		
Mammals		
Burro deer	*Odocoileus hemionus eremicus*	762,000 (8%)
Desert kit fox	*Vulpes macrotis arsipus*	6,690,000 (67%)

Table III.7-82
Acreage of Landscape Habitat Linkages within the BLM LUPA by Ecoregion Subarea

Ecoregion Subarea	Desert Linkage Network (acres)
Cadiz Valley and Chocolate Mountains	709,000
Imperial Borrego Valley	188,000
Kingston and Funeral Mountains	138,000
Mojave and Silurian Valley	379,000
Owens River Valley (southern end)	150,00
Panamint Death Valley	149,000
Pinto Lucerne Valley and Eastern Slopes	201,000
Piute Valley and Sacramento Mountains	111,000
Providence and Bullion Mountains	377,000
West Mojave and Eastern Slopes	401,000
Total	**2,669,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

III.7.9.1 Bureau of Land Management Land Use Plan Amendment Affected Environment for Special-Status Species Not Covered under the DRECP

The BLM LUPA affected environment supports 102 Non-Focus Species, differing by 21 fewer species than the list of Non-Focus Species found in the DRECP Plan Area (Table III.7-57) provided in Section III.7.6.4. Non-Focus Species within the DRECP Plan Area not found within the BLM LUPA lands include white-tailed kite (*Elanus leucurus*), redhead, Tehachapi pocket mouse, Palm Springs pocket mouse (*Perognathus longimembris bangsi*), hoary bat, big free-tailed bat (*Nyctinomops macrotis*), Arizona myotis (*Myotis occultus*), western small-footed myotis, western yellow bat, Cima milk-vetch (*Astragalus cimae* var. *cimae*), flat-seeded spurge (*Chamaesyce platysperma*), Munz's cholla (*Cylindropuntia munzii)*, Sodaville milk-vetch, Parish's alkali grass, Parry's spineflower (*Chorizanthe parryi* var. *parryi*),

Mojave Desert plum (*Prunus eremophila*), San Bernardino aster (*Symphyotrichum defoliatum*), small-flowered bird's beak (*Cordylanthus parviflorus*), recurved larkspur (*Delphinium recurvatum*), Thorne's buckwheat (*Eriogonum thornei*), and Piute Mountains jewel-flower (*Streptanthus cordatus var. piutensis*). Four of the Non-Focus Species are only found on BLM LUPA lands: Shoshone Cave whip-scorpion (*Hubbardia shoshonensis*), Amargosa speckled dace (*Rhinichthys osculus* ssp.), Amargosa springsnail (*Pyrgulopsis amargosae*), and yellow-eared pocket mouse (*Perognathus xanthonotus*).

Several of the non-Focus Species found in the BLM LUPA lands within the DRECP are federally listed as threatened or endangered and have designated critical habitat present within BLM LUPA lands. Table III.7-83 details these species including the total area within the BLM LUPA lands.

Table III.7-83
Designated Critical Habitat Within the BLM LUPA Lands for Non-Focus Species

Common Name	Scientific Name	Federal Status[1]	State Status[2]	Acres of Critical Habitat within the BLM LUPA Lands
Amphibians				
Arroyo toad	*Anaxyrus (Bufo) californicus*	FE	CSC	30
Mammals				
Amargosa vole	*Microtus californicus scirpensis*	FE, BLM[3]	SE	4,000
Bighorn sheep (Peninsular Ranges DPS)	*Ovis canadensis nelsoni*	FE, BLM	ST, FP	7,000
Plants				
Amargosa nitrophila	*Nitrophila mohavensis*	FE	SE, (CRPR 1B.2)	1,000
Ash Meadows gumplant	*Grindelia fraxinipratensis*	FT	(CRPR 1B.2)	300
Cushenbury buckwheat	*Eriogonum ovalifolium* var. *vineum*	FE	(CRPR 1B.1)	400
Cushenbury milk-vetch	*Astragalus albens*	FE	(CRPR 1B.1)	800
Cushenbury oxytheca	*Acanthoscyphus parishii* var. *goodmaniana*	FE	(CRPR 1B.1)	80
Lane Mountain milk-vetch	*Astragalus jaegerianus*	FE	(CRPR 1B.1)	10,000
Pierson's milk-vetch	*Astragalus magdalenae* var. *peirsonii*	FT	SE	12,000

1 Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern; Eagle Act: Bald and Golden Eagle Protection Act.

2 State Status – SE: California Endangered; ST: California Threatened; SC: California Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; WBWG: Western Bat Working Group species. California Rare Plant Rank

(CRPR, formerly known as the CNPS List) – CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere;

[3] Indicates BLM species that have associated CMAs, detailed in Volume II, Chapter II.3, Section II.3.4.2.

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

III.7.10 Biological Resources Outside the DRECP Plan Area

III.7.10.1 Transmission

The California Floristic Province, which encompasses the area west of the deserts and Sierra Nevada–Cascade mountain crests, is one of the top 25 biodiversity hotspots in the world, with over 2,100 endemic plant species and 71 endemic vertebrate species (Myers et al. 2000). A wide variety of listed and special-status species is found outside the DRECP Plan Area, in areas that may be affected by renewable energy transmission projects. Proposed projects outside of the DRECP Plan Area would be subject to additional review under CEQA or NEPA, as applicable.

III.7.10.1.1 Regulatory Setting

The regulatory setting presented in Section III.7.1 also applies to the transmission corridors outside of the DRECP Plan Area. Additionally, several Land Management Plans, HCPs, and other land use plans and policies apply to areas outside of the DRECP Plan Area. Projects located partially within these areas may be subject to the specific requirements of each applicable plan or at a minimum would be reviewed for consistency with applicable plans. Additional regulations may apply to transmission corridors sited outside of the DRECP Plan Area, depending on specific location.

Federal

USFS Land Management Plan: Southern California National Forests

Adopted in 2006, this planning effort updated the joint Land Management Plans for the four Southern California national forests: Angeles, San Bernardino, Los Padres, and Cleveland. The Land Management Plans provide forest-wide strategic direction designed to achieve the desired conditions described for each of the Southern California national forests and emphasize the protection of threatened and endangered species. A proposed amendment to the Land Management Plans is being produced to revise land use zone allocations for select Inventoried Roadless Areas within the four forests and amend Land Management Plan monitoring protocols.

Compliance with the Land Management Plans typically requires the preparation of documents assessing impacts to biological resources, including a Management Indicator Species Report, a Biological Evaluation/Biological Assessment, revegetation and weed management plans, and (where needed) an assessment of impacts to Riparian Conservation Areas. NEPA documents must also consider impacts to species designated as "Sensitive" by the USFS on each forest.

South Coast RMP

The South Coast RMP provides guidance for the management of approximately 300,000 acres of BLM-administered public lands in portions of five Southern California counties: San Diego, Riverside, San Bernardino, Orange, and Los Angeles. The South Coast RMP was completed and signed in 1994. Since that time there have been significant changes in the patterns of urban growth, increased demands on the resources of the public lands, changing policies and emphasis on the management of public lands and local land use planning, and the listing of additional threatened or endangered species. The South Coast RMP currently is being revised.

California Desert Conservation Area Plan (1980, as amended)

Administered by the BLM, the CDCA Plan requires that proposed development projects be compatible with policies that provide for the protection, enhancement, and sustainability of fish and wildlife species, wildlife corridors, riparian and wetland habitats, and native vegetation resources.

Northern and Eastern Colorado Desert Coordinated Management Plan (NECO)

The NECO is a landscape-scale, multiagency planning effort that protects and conserves natural resources while simultaneously balancing human uses of the California portion of the Sonoran Desert ecosystem. The planning area encompasses over five million acres and hosts 60 special-status plant and animal species. NECO amends the 1980 CDCA plan.

Local/Regional

San Diego Multiple Species Conservation Program (MSCP)

The MSCP, approved in 1996, provides a framework for protection of 23 vegetation types and 85 species in southwestern San Diego County. The Multiple Habitat Planning Area was designated within the permanent MSCP preserve and will be assembled through conservation of lands already in public ownership (85,000 acres), purchase of private lands from willing sellers (27,000 acres), and additional contributions through mitigation for development impacts (63,000 acres). The MSCP is to be implemented by the county and 11 cities in the DRECP Plan Area through Subarea Plans.

Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP)

The Western Riverside MSHCP is a comprehensive, multijurisdictional HCP and NCCP focusing on conservation of species and their associated habitats in Western Riverside County. This MSHCP is one of several large, multijurisdictional habitat-planning efforts in Southern California with the overall goal of maintaining biological and ecological diversity within a rapidly urbanizing region. The MSHCP Plan Area encompasses approximately 1.26 million acres (2,000 square miles); it includes all unincorporated Riverside County land west of the crest of the San Jacinto Mountains to the Orange County line, as well as the jurisdictional areas of the cities of Temecula, Murrieta, Lake Elsinore, Canyon Lake, Norco, Corona, Riverside, Moreno Valley, Banning, Beaumont, Calimesa, Perris, Hemet, and San Jacinto.

Coachella Valley MSHCP

The Coachella Valley MSHCP provides a regional vision for balanced growth to meet the requirements of federal and state endangered species laws, while promoting enhanced opportunities for recreation, tourism, development, and job growth. The Coachella Valley MSHCP aims to conserve over 240,000 acres of open space, and protect 27 plant and animal species and 27 vegetation types. The Coachella Valley Association of Governments served as lead agency for plan review and consideration. Participants (permittees) include Riverside County, the cities of Cathedral City, Coachella, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, Rancho Mirage as well as the Coachella Valley Water District and Imperial Irrigation District.

San Joaquin County MSHCP

The San Joaquin County MSHCP provides a strategy for balancing the need to conserve open space and the need to convert open space to non-open space uses while protecting the region's agricultural economy; preserving landowner property rights; providing for the long-term management of plant, fish, and wildlife species, especially those that are currently listed, or may be listed in the future, under the ESA or CESA; providing and maintaining multiple-use open spaces which contribute to the quality of life of the residents of San Joaquin County; and accommodating a growing population while minimizing costs to project proponents and society at large.

Kern County Valley Floor HCP

The Kern County Valley Floor HCP is a long-term program designed to conserve federally protected species, state-protected species, and/or other species of concern. It establishes the conditions under which Kern County, the California Division of Oil, Gas, and Geothermal Resources, and other program beneficiaries are seeking authorization

to allow the taking of multiple federally and state-protected species. It includes conservation strategies that will mitigate for the continued operation and development of oil and gas production, water district activities, urban development, and the development and maintenance of public infrastructure.

Clark County MSHCP

The Clark County MSHCP and the resultant USFWS Section 10(a) incidental take permit are designed to allow the incidental take of species covered by the ESA (Clark County 2000) on nonfederal lands. The MSHCP provides for the long-term conservation and recovery of native species of wildlife and plants and their vegetation types, while allowing for regulated development of lands within Clark County. The plan is designed to comply with statutory and regulatory requirements of the ESA and NEPA. The plan represents a county-wide conservation strategy that emphasizes ecosystem-level management of natural resources. The plan supplants earlier species-specific conservation efforts.

III.7.10.1.2 Transmission

The transmission required outside of the DRECP Plan Area would generally fall into four geographic areas: San Diego, Los Angeles, Central Valley, and North Palm Springs–Riverside. An overview of the biological resources in each of these areas is provided in the following discussion.

III.7.10.1.2.1 San Diego Area

The San Diego area corridor exits the DRECP boundary southwest through the Jacumba area, heads northwest through the McCain Valley, southwest, then south around the Cleveland National Forest, and then heads west and northwest through Alpine and urban and suburban areas in the cities of Santee, El Cajon, and San Diego.

Vegetation and Habitats. The southeastern portion of the corridor east of Jacumba is predominately desert scrub and sand habitats composed of Sonoran creosote bush scrub, Sonoran Desert mixed scrub, Sonoran wash scrub, and Sonoran mixed woody scrub. West of Jacumba, the vegetation transitions into semi-desert chaparral.

As the corridor passes northwest through the McCain Valley, south around the southern boundary of the Cleveland National Forest, and northwest through the Cleveland National Forest, chaparral, including northern mixed chaparral, and semi-desert chaparral are the predominant vegetation types. Other vegetation types in the area include sage scrub, grasslands, oak riparian forest, oak woodlands, and riparian forest.

From the existing Suncrest Substation northwest toward the corridor's terminus at the Sycamore Substation, the predominant vegetation types are coastal sage scrub and

chaparral; many areas have burned in recent years and are now in various stages of succession. Other vegetation types include southern coast live oak riparian forest, southern cottonwood–willow riparian forest, mulefat scrub, coast live oak woodland, non-native grassland, vernal pools, and developed areas.

Vegetation along this corridor that is within potentially jurisdictional waters of the state or waters of the United States along includes Sonoran wash scrub, mulefat scrub, southern willow scrub, southern cottonwood–willow riparian forest, southern riparian forest, and southern coast live oak riparian woodland.

Special-Status Species. The desert scrub, chaparral, and other vegetation types along the central and southeastern portions of the corridor may support several special-status plants including, but not limited to Orcutt's brodiaea (*Brodiaea orcutti*), Dunn's mariposa lily (*Calochortus dunnii Purdy*), Dehesa nolina (*Nolina interrata*), San Diego thornmint (*Acanthomintha ilicifolia*), Gander's ragwort (*Packera gander*), peninsular manzanita (*Arctostaphylos peninsularis*), delicate clarkia (*Clarkia delicata*), Tecate tarplant (*Deinandra floribunda*), Baja navarretia (*Navarretia peninsularis*), and southern jewel flower (*Streptanthus campestris*). Special-status animals with potential to occur include, but are not limited to Quino checkerspot butterfly (*Euphydryas editha quino*), barefoot banded gecko (*Coleonyx switaki*), burrowing owl, Swainson's hawk, least Bell's vireo, southwestern willow flycatcher, bald eagle (wintering), coast horned lizard, Bell's sparrow (*Artemisiospiza belli*), Cooper's hawk (*Accipiter cooperii*), golden eagle, rufous-crowned sparrow, yellow warbler, white-tailed kite, San Diego black-tailed jack rabbit (*Lepus californicus* ssp. *bennettii*), and desert bighorn sheep.

Management Indicator Species and their associated habitat type/management issue potentially requiring assessment on the Cleveland National Forest include mountain lion (fragmentation), mule deer (healthy diverse habitats), song sparrow (riparian habitat), and Engelmann oak (*Quercus engelmannii*) (oak regeneration).

The coastal sage scrub and other habitat toward the northwestern portion of the corridor may support coastal California gnatcatcher (*Polioptila californica californica*), least Bell's vireo, northern harrier and yellow warbler, California adolphia (*Adolphia californica*), Del Mar manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*), summer holly (*Comarostaphylis diversifolia*), San Diego sand aster (*Corethrogyne filaginifolia* var. *incana*), San Diego barrel cactus (*Ferocactus viridescens*), and Nuttall's scrub oak (*Quercus dumosa*). Vernal pools along the alignment may support any of several special-status plants and invertebrates, such as San Diego fairy shrimp (*Branchinecta sandiegonensis*) and San Diego mesa mint (*Pogogyne abramsii*).

Special Management Areas and Designated Critical Habitat

The transmission lines in the San Diego area would be in or near several special management areas outside of the DRECP Plan Area, as shown in Table III.7-84.

Table III.7-84
Special Management Areas and Designated Critical Habitat
Outside the DRECP Plan Area – San Diego Area

Special Management Area	Line Segment(s)
Cleveland National Forest	Ocotillo to Suncrest Suncrest to Sycamore
San Diego County MSCP	Ocotillo to Suncrest
San Diego County Multiple Habitat Conservation Open Space Plan	Suncrest to Sycamore
Jacumba Wilderness	Ocotillo to Suncrest
Carrizo Gorge Wilderness	Ocotillo to Suncrest
Hauser Wilderness	Ocotillo to Suncrest
Pine Creek Wilderness	Ocotillo to Suncrest
Anza-Borrego Desert State Park	Ocotillo to Suncrest
Proposed Viejas Mountain Research Natural Area	Suncrest to Sycamore
Viejas Mountain Critical Biological Area	Suncrest to Sycamore
El Capitan Preserve	Suncrest to Sycamore
San Vicente Highlands	Suncrest to Sycamore
Sycamore Canyon Preserve	Suncrest to Sycamore
Designated Critical Habitat	
Quino checkerspot butterfly	Ocotillo to Suncrest
Coastal California gnatcatcher	Suncrest to Sycamore
San Diego thornmint	Suncrest to Sycamore
Areas of Critical Environmental Concern	
Table Mountain	Ocotillo to Suncrest
In-Ko-Pah Mountains	Ocotillo to Suncrest

III.7.10.1.2.2 Los Angeles Area

There are three corridors in the Los Angeles area. The area includes the Los Angeles basin and surrounding areas, including portions of the high desert in Los Angeles and San Bernardino counties and the Angeles and San Bernardino national forests in the San Gabriel Mountains.

Vegetation and Habitats. The Vincent Substation is in the southern portion of the Antelope Valley in Los Angeles County, just north of the northern boundary of the Angeles National Forest (ANF). This area is a transitional zone between the desert vegetation to the north and the montane scrub and woodlands to the south, in the San Gabriel Mountains. Common vegetation types in the desert foothills of the San Gabriel Mountains include Mojave juniper woodland and scrub, California annual grassland, Mojave pinyon woodland, desert wash, big sagebrush scrub, and mixed chaparral.

Steep topography is common farther south in the San Gabriel Mountains. Diverse native shrublands, woodlands, and several prominent riparian corridors occur here. Jurisdictional drainages range from perennial creeks in larger canyons to small intermittent or ephemeral streams, washes, and dry channels on adjacent slopes. The majority of the vegetation within the ANF portion of this corridor is mixed chaparral or chamise chaparral. Canyon oak forest and bigcone Douglas fir—canyon live oak forest are also common. Coastal vegetation types found on the southern slope of the San Gabriel Mountains include southern coast live oak riparian forest and coastal sage scrub. Several riparian vegetation types are located in deeper canyons along rivers or creeks: southern willow scrub, southern sycamore alder riparian woodland, southern cottonwood–willow riparian forest, and southern arroyo willow riparian forest.

South of the ANF, the transmission corridors traverse the southern foothills of the San Gabriel Mountains. The easternmost corridor, following Segment 7 of the Tehachapi Renewable Transmission Project, traverses coastal sage scrub habitat down to the base of the foothills. From this point, the corridor continues south through residential neighborhoods to the San Gabriel River. The corridor parallels the San Gabriel River and the San Gabriel Freeway in a generally southwest direction. The San Gabriel River in this area is surrounded primarily by urban development. It is channelized within concrete banks and the channel bottom is intermittently lined with concrete though several soft-bottom sections support large stands of native vegetation. In some areas, there also are large stands of native vegetation on adjacent uplands.

As the corridor extends southwest, it traverses primarily urban development and highly degraded, ruderal habitats. However, patches of native vegetation, including riparian habitat such as mulefat and southern willow scrub, Riversidean alluvial fan sage scrub, and coastal sage scrub are interspersed among large blocks of development. Within and adjacent to the San Gabriel River corridor, the Santa Fe Dam Floodplain Significant Ecological Area, Whittier Narrows Dam Recreation Area, and Montebello Oil Fields support large stands of native coastal sage and Riversidean alluvial fan sage scrub, as well as smaller ribbons of riparian scrub.

From the southern boundary of the ANF, the western corridor (following Segment 11 of the Tehachapi Renewable Transmission Project), passes through Eaton Canyon and extends south to the existing Mesa Substation through an existing utility corridor. This segment traverses heavily developed areas with major roadways and residential, commercial, and industrial properties. Just north of the Mesa Substation, the segment lies just west of the Whittier Narrows Dam Recreation Area and just northwest of the Montebello Oil Fields.

The eastern most corridor in the Los Angeles area exits the San Bernardino National Forest (SBNF) in the southern foothills of the San Gabriel Mountains and follows the foothills west through the foothill vegetation types of the Inland Empire and San Gabriel Valley. Here the corridor crosses residential developments interspersed with open space supporting coastal sage scrub, California annual grasslands, and both natural and channelized drainages. In the San Dimas area, the route continues away from the foothills in a west–southwest direction through the urbanized San Gabriel Valley in the Los Angeles basin, across habitat similar to those described for the corridors south of the ANF. This area is largely urban, and habitat for special-status species is generally limited and degraded where it does occur.

From a wildlife movement perspective, the San Gabriel Mountains are a large block of continuous open space surrounded by transitional ecotones, including the arid desert regions to the north and the highly developed San Gabriel Valley and Los Angeles basin to the south. As a result, the ANF and SBNF provide expansive habitat for wildlife movement and represent a broad, regional linkage between the San Bernardino Mountains to the east and the Santa Susana and Sierra Madre mountains to the west.

Special-Status Species. The ANF and SBNF portions of these alignments generally support high-quality habitat for plants and wildlife. Listed and special-status species occurring in the San Gabriel Mountains include, but are not limited to, California condor, California spotted owl (*Strix occidentalis occidentalis*), least Bell's vireo, southwestern willow flycatcher, California red-legged frog (*Rana draytonii*), Santa Ana sucker (*Catostomus santaanae*), thread-leaved brodiaea (*Brodiaea filifolia*), slender-horned spineflower (*Dodecahema leptoceras*), and spreading navarretia (*Navarretia fossalis*). The eastern San Gabriel Mountains (in the SBNF) also support Sierra Madre yellow-legged frog (*Rana muscosa*) and bighorn sheep. Swainson's hawk is a noteworthy listed and special-status species occurring outside the DRECP Plan Area, north of the San Gabriel Mountains.

South of the ANF in the Los Angeles basin, remnant or fragmented habitats and riparian corridors are occupied by least Bell's vireo and coastal California gnatcatcher. The southwestern willow flycatcher historically nested in the area, and still occurs in riparian habitats during migration. Listed plants recorded in this area include Braunton's milk-vetch (*Astragalus brauntonii*) and Nevin's barberry (*Berberis nevinii*).

Special Management Areas and Designated Critical Habitat

The transmission corridors in the Los Angeles area would be in or near several special management areas outside of the DRECP Plan Area, as shown in Table III.7-85.

Table III.7-85
Special Management Areas and Designated Critical Habitat Outside the DRECP Plan Area – Los Angeles Area

Special Management Area	Line Segment(s)
Angeles National Forest	Vincent to Mesa Vincent to Lighthipe
San Bernardino National Forest	Station 7 to Station B/Station 8
Designated Critical Habitat	
Sierra Madre yellow-legged frog	Station 7 to Station B/Station 8
Santa Ana sucker	Vincent to Lighthipe Vincent to LADWP Station E
San Bernardino kangaroo rat	Station 7 to Station B/Station 8
Southwestern willow flycatcher	Vincent to Mesa Vincent to Lighthipe Station 7 to Station B/Station 8 Vincent to LADWP Station E
Coastal California gnatcatcher	Vincent to Mesa Vincent to Lighthipe Station 7 to Station B/Station 8
Thread-leaved brodiaea	Station 7 to Station B/Station 8

LADWP = Los Angeles Department of Water and Power

III.7.10.1.2.3 North Palm Springs–Riverside Area

The North Palm Springs–Riverside Area includes part of the Coachella Valley in the Colorado Desert of Riverside County, the Inland Empire area of western Riverside County and southwestern San Bernardino County, and the high desert of San Bernardino County just north of Cajon Pass and the San Gabriel and San Bernardino mountains.

Vegetation and Habitats. Transmission in the North Palm Springs–Riverside Area includes several potential corridors. The portion of the corridor between the DRECP Plan Area (near Chiriaco Summit) and the Devers Substation generally follows the I-10 corridor. This corridor traverses patches of mesquite hummocks, stabilized sand fields, stabilized desert dunes, ephemeral sand fields, dry desert wash woodland, and Sonoran mixed woody and succulent scrub that are interspersed with areas of Sonoran creosote bush scrub. The corridor also crosses scattered agricultural areas, disturbed areas, and developed areas. The route runs just south of Joshua Tree National Park. This alignment crosses the Coachella

Valley National Wildlife Refuge. Due to the proximity to I-10, many areas along this alignment show some degree of human disturbance, including trash dumping and OHV use.

From Desert Center and heading west, the alignment follows the I-10 corridor through the western Colorado Desert in Riverside County to the Vista Substation in the urbanized Inland Empire of San Bernardino County. Native vegetation in the desert portion of the corridor includes Sonoran creosote bush scrub, Sonoran mixed woody and succulent scrub, and brittlebush scrub, saltbush scrub, catclaw acacia, and catclaw acacia/grassland. Disturbed vegetation, consisting of ruderal and non-native grasslands, is also present.

Disturbances to the native habitats between the Devers Substation and Whitewater River include wind farms and scattered residential properties. The Whitewater River, at the location where the alignment would cross, is a deep, cobble-bottomed gorge with steep banks. Sandbar willow is present but sparse, and water is present part of the year. The floodplain of Whitewater River is a sand source and transport corridor for wind-blown sand habitat downstream. It is also an important linkage to other habitat areas located south of I-10. This route would also traverse large desert washes flowing from canyons in the foothills of the San Bernardino Mountains. In the San Gorgonio Pass between Whitewater River and the city of Cabazon, the line would traverse creosote bush scrub, mixed woody and succulent scrub, and desert dry wash woodlands. These areas are also important sand source and transport corridors to habitat south of I-10. The pass is a developed wind resource area, with multiple wind energy developments that constitute the majority of development in this area.

From the Cabazon area through Banning and Beaumont, vegetation in the corridor primarily consists of non-native grasslands, Riversidean sage scrub, chaparral, catclaw scrub, and disturbed areas. The drainages in this area support either a sparse distribution of mixed scalebroom and desert willow or riparian vegetation types. Along the San Gorgonio River, vegetation is sparse scalebroom with scattered desert willows and some coast live oak, sycamore, and cottonwood trees. Just west of the San Gorgonio River, the vegetation is mixed Riversidean sage scrub and chaparral on the undisturbed foothills north of Banning and Beaumont. Farther west, the corridor is dominated by non-native grasslands, developed lands, and other areas disturbed by human activities. These developed and disturbed areas include a patchy distribution of non-native grasslands and ruderal areas that include non-native and weedy plant species.

As the corridor continues west through Calimesa and San Timoteo Canyon, vegetation is a patchy mosaic of chaparral, mixed sage scrub/chaparral/grassland, oak woodland, and non-native grassland. Periodic fires have converted native shrublands to non-native grasslands in some areas. A few areas support scattered oak woodlands, and the San Timoteo Creek supports southern cottonwood–willow riparian forest, southern sycamore–

alder riparian woodland, and southern coast live oak riparian forest. There also are developed lands and agricultural lands along San Timoteo Canyon.

West of San Timoteo Canyon, the corridor traverses hills dominated by non-native grasslands and mixed sage scrub. The alignment crosses several residential developments in this area before reaching the Vista Substation.

From Vista Substation to Rancho Vista Substation, the corridor traverses developed areas, with the exception of the Santa Ana River just west of the Vista Substation and scattered areas supporting non-native annual grasslands, disturbed sage scrub vegetation types, or fallow agricultural fields.

From Rancho Vista Substation to Lugo Substation, the corridor traverses developed areas just west of and parallel to I-15. The route crosses the southern boundary of the SBNF in the vicinity of the easternmost line in the Los Angeles area. It would parallel that line to the Lugo Substation just north of the Cajon Pass.

The corridor from Devers Substation to Valley Substation generally follows the route previously described for Devers to Vista until southwest of Cabazon, where it veers southwest and climbs into the foothills of the San Jacinto Mountains. On the lower slopes, vegetation is dominated by brittlebush scrub and cheesebush; on the higher slopes it transitions to semi-desert chaparral, sage scrub, and chamise chaparral. Farther west, vegetation types on the hills south of Banning and Beaumont, the hills adjacent to Highway 79, and in the Lakeview Mountains include buckwheat scrub, mixed buckwheat–chamise chaparral, saltbush scrub, and scattered patches of Riversidean sage scrub. Non-native grasslands and mixed scrub vegetation types are present through the "Badlands" between Beaumont and the San Jacinto Valley. The route crosses Smith Creek south of Banning, which supports a sparse riparian vegetation. It also crosses the San Jacinto River in the San Jacinto Valley. Numerous small ephemeral drainages are present in the foothills of the San Jacinto Mountains, in the Badlands area, and in the Lakeview Mountains.

This corridor crosses through developed areas at the base of the foothills southwest of Cabazon, east of Old Banning–Idyllwild Road, south of Banning, and north of the Valley Substation. Scattered rural development also occurs in the areas south of Banning and Beaumont and in portions of San Jacinto and Romoland. It crosses agricultural areas in the San Jacinto Valley between Gilman Springs Road and just south of Ramona Expressway and in portions of Romoland, located north of the Valley Substation.

A third corridor would include lines from the IID Midway X Substation to the Devers Substation. The portion of this corridor in Riverside County would be outside of the DRECP boundary. This line would travel northwest through the eastern portion of the Coachella Valley and would run near the northeastern edge of the Salton Sea. Vegetation along this

portion of the route is similar to the area between Desert Center and Devers Substation, and includes desert scrub vegetation types of varying levels of disturbance, annual grasslands, some developed areas, stabilized sand dunes, and ephemeral drainages and desert washes (some supporting sparse desert riparian vegetation). Just north of the DRECP Plan Area boundary, the corridor crosses Dos Palmas Preserve, an oasis of fan palms in a perennial marsh.

An additional corridor would extend from Rancho Vista Substation to Serrano Substation. From the Rancho Vista Substation, this line would travel southwest through developed areas interspersed with active and fallow agriculture in and around Ontario and Chino. West of SR-71, the line would traverse non-native annual grasslands and coastal sage scrub vegetation types of varying levels of disturbance within the Chino Hills. Several canyons support oak woodlands and fragments of riparian habitats. On the south side of the Chino Hills, the route enters mostly residential developed areas. It continues south over SR-91 in primarily developed areas interspersed with parks and small blocks of open space supporting grasslands, coastal sage scrub, some areas of oak woodlands, and a golf course.

Special-Status Species. Listed wildlife species in this region include, but are not limited to, desert tortoise, Coachella Valley fringe-toed lizard, Stephen's kangaroo rat (*Dipodomys stephensi*), San Bernardino kangaroo rat (*Dipodomys merriami parvus*), least Bell's vireo, southwestern willow flycatcher, and coastal California gnatcatcher. Golden eagles nest in the San Bernardino Mountains and foothills, and forage along the foothills and desert floor, and burrowing owls are also known from the region. Listed plants include Mojave tarplant, Coachella Valley milk-vetch, Nevin's barberry, slender-horned spineflower, Munz's onion (*Allium munzii*), San Diego ambrosia (*Ambrosia pumila*), Santa Ana River woollystar (*Eriastrum densifolium* ssp. *sanctorum*), San Jacinto Valley crownscale (*Atriplex coronata* var. *notatior*), and spreading navarretia.

Special Management Areas and Designated Critical Habitat

The transmission lines in the North Palm Springs–Riverside area would be in or near several special management areas outside of the DRECP Plan Area, as shown in Table III.7-86.

Table III.7-86
Special Management Areas and Designated Critical Habitat Outside the DRECP Plan Area – North Palm Springs–Riverside Area

Special Management Area	Line Segment(s)
CDCA Plan	Desert Center to Devers Devers to Rancho Vista Devers to Valley
NECO	Desert Center to Devers Devers to Rancho Vista Devers to Valley
Coachella Valley MSHCP	Desert Center to Devers Devers to Rancho Vista Devers to Valley
Western Riverside MSHCP	Devers to Rancho Vista Devers to Valley
Coachella Valley National Wildlife Refuge	IID Midway X to Devers
Sonny Bono Salton Sea National Wildlife Refuge	IID Midway X to Devers
San Jacinto Wildlife Area	Devers to Valley
San Jacinto and Santa Rosa Mountains National Monument	Devers to Valley
San Bernardino National Forest	Rancho Vista to Lugo Devers to Valley
Joshua Tree National Park	Desert Center to Devers
Mecca Hills (a Riverside County Natural Area)	Desert Center to Devers
Coachella Valley Preserve	Desert Center to Devers
Indio Hills Palms State Park	IID Midway X to Devers Colorado River to Devers
San Timoteo Canyon State Park	Devers to Rancho Vista
Designated Critical Habitat	
Desert tortoise	Desert Center to Devers IID Midway X to Devers
Coachella Valley fringe-toed lizard	Desert Center to Devers IID Midway X to Devers
San Bernardino kangaroo rat	Devers to Valley Devers to Rancho Vista Rancho Vista to Lugo
Spreading navarretia	Devers to Valley
Santa Ana sucker	Devers to Rancho Vista
Southwestern willow flycatcher	Devers to Rancho Vista
Coastal California gnatcatcher	Devers to Rancho Vista

Table III.7-86
Special Management Areas and Designated Critical Habitat
Outside the DRECP Plan Area – North Palm Springs–Riverside Area

Special Management Area	Line Segment(s)
Areas of Critical Environmental Concern	
Potrero ACEC, South Coast Land Use Plan	Devers to Valley
Whitewater Canyon ACEC	Devers to Rancho Vista
Big Morongo Canyon Preserve/ACEC	Devers to Sub 12
Coachella Valley fringe-toed Lizard ACEC	Desert Center to Devers
Dos Palmas Preserve/ACEC	IID Midway X to Devers

III.7.10.1.2.4 Central Valley Area

The transmission corridor in the Central Valley Area exits the DRECP boundary northwest of Whirlwind Substation near Tehachapi. It extends westward over the Tehachapi Mountains, descends into the southern San Joaquin Valley and travels north in the foothills of the Diablo Mountains before reaching its terminus near Tracy.

Vegetation and Habitats. Outside of the DRECP boundary near Tehachapi, predominant vegetation types include Mojave creosote bush scrub, big sagebrush scrub, rabbitbrush scrub, and desert saltbush scrub. Over the Tehachapi pass, the vegetation transitions to chaparral and areas of southern cottonwood–willow riparian forest. It then descends northwest into the southern San Joaquin Valley, which is almost entirely irrigated agriculture and developed lands. As it extends north along the eastern foothills of the Diablo Mountains north to Tracy, the predominant vegetation type is non-native annual grassland used for grazing. Other vegetation types along this Central Valley alignment may include alkaline meadow, freshwater marsh, Great Valley cottonwood riparian forest, sycamore alluvial woodland, mulefat scrub, and saltbush scrub.

Special-Status Species. The Tehachapi area supports a diversity of special-status species including, but not limited to, burrowing owl, California horned lark (*Eremophila alpestris actia*), Cooper's hawk, golden eagle, Le Conte's thrasher, loggerhead shrike, long-eared owl, merlin, northern harrier, prairie falcon, and Vaux's swift (*Chaetura vauxi*). Desert scrub habitats may support special-status rodents such as yellow-eared pocket mouse, and Tehachapi pocket mouse. Special-status plants with regional potential to occur include white pygmy poppy (*Canbya candida*), golden violet (*Viola aurea*), Kern buckwheat, Charlotte's phacelia, and Bakersfield cactus, Tehachapi (flax-like) monardella (*Monardella linoides* ssp. *oblonga*), pale-yellow layia (*Layia heterotricha*), slender nemacladus (*Nemacladus gracilis*), Mt. Pinos larkspur (*Delphinium parryi* ssp. *purpureum*), adobe yampah (*Perideridia pringlei*), and Piute cypress (*Hesperocyparis nevadensis*).

Areas converted to agriculture such as those in the San Joaquin Valley do not support a high diversity of special-status wildlife, but may provide suitable foraging habitat for raptors including ferruginous hawk, northern harrier, prairie falcon, and Swainson's hawk, as well as species adapted to human disturbance such as burrowing owl. Swainson's hawk, white-tailed kites, and loggerhead shrikes may nest in trees on the valley floor. Western pond turtle (*Emys marmorata*) may occur in drainages between agriculture fields. Tricolored blackbirds may nest in grain fields. Special-status animals potentially occurring along the foothills in grassland habitats include, but are not limited to American badger, blunt-nosed leopard lizard (*Gambelia sila*), California red-legged frog, foothill yellow-legged frog (*Rana boylii*), giant kangaroo rat (*Dipodomys ingens*), Nelson's antelope squirrel (*Ammospermophilus nelson*), San Joaquin kit fox (*Vulpes macrotis mutica*), San Joaquin pocket mouse (*Perognathus inornatus*), San Joaquin whipsnake (*Masticophis flagellum ruddocki*), short-nosed kangaroo rat (*Dipodomys nitratoides brevinasus*), and Tulare grasshopper mouse (*Onychomys torridus tularensis*). Special-status plant species with potential to occur include, but are not limited to, chaparral ragwort (*Senecio aphanactis*), Lost Hills crownscale (*Atriplex vallicola*), Munz's tidy-tips (*Layia munzii*), Panoche pepper grass (*Lepidium jaredii album*), recurved larkspur, round-leaved filaree (*California macrophylla*), San Joaquin woollythreads (*Monolopia congdonii*), and Temblor buckwheat (*Eriogonum temblorense*).

Special Management Areas and Designated Critical Habitat

The transmission lines in the Central Valley area would be in or near several special management areas outside of the DRECP Plan Area, as shown in Table III.7-87.

Table III.7-87
Special Management Areas and Designated
Critical Habitat Outside the DRECP Plan Area – Central Valley Area

Special Management Area	Line Segment(s)
San Joaquin County HCP	Los Banos to Tracy
Kern County Valley Floor HCP	Midway to Gates Whirlwind to Midway
Metropolitan Bakersfield HCP	Whirlwind to Midway
Kern Water Bank HCP	Whirlwind to Midway
San Luis Reservoir State Recreation Area	Los Banos to Tracy Gates to Los Banos
Los Banos Wildlife Area	Gates to Los Banos
O'Neill Forebay Wildlife Area	Gates to Los Banos
San Luis Reservoir Wildlife Area	Gates to Los Banos

Table III.7-87
Special Management Areas and Designated
Critical Habitat Outside the DRECP Plan Area – Central Valley Area

Special Management Area	Line Segment(s)
Upper Cottonwood Creek Wildlife Area	Gates to Los Banos
Little Panoche Wildlife Area	Gates to Los Banos
Designated Critical Habitat	
California condor	Whirlwind to Midway
California red-legged frog	Los Banos to Tracy
Areas of Critical Environmental Concern	
Panoche/Coalinga	Gates to Los Banos
Kettleman Hills	Midway to Gates

III.7.10.2 Bureau of Land Management Land Use Plan Amendment

Biological resources found within CDCA Plan Area lands but outside the DRECP Plan Area (i.e., the DRECP boundary) are discussed in the following sections, including vegetation types and other landcovers, special-status species, and landscape habitat linkages and wildlife movement corridors.

The lands outside of the DRECP Plan Area that are found within the CDCA Plan Area are located in two primary regions: north of the DRECP Plan Area, and southwest of the DRECP Plan Area. As seen in Figure I.0-1 (see Volume I, Section I.0.1), the areas north of the DRECP Plan Area are found in Inyo County, primarily east of the Owens Valley within the White Mountain and Inyo Mountain ranges, with a small portion in Sequoia National Forest at the south end of the Sierra Nevada mountain range. The BLM LUPA lands southwest of the DRECP Plan Area include primarily the Coachella Valley in Riverside County, with small portions along the eastern edge of San Diego County and western edge of Imperial County.

III.7.10.2.1 Vegetation Types and Other Landcovers

Table III.7-88 provides the list of vegetation types outside the DRECP Plan Area within BLM LUPA lands.

Table III.7-88
Vegetation Types Outside of the DRECP Plan Area within BLM LUPA Lands

Vegetation Types	North of Plan Area (acres)	Southwest of Plan Area (acres)	Total (acres)
Dune/Rocky, Barren, and Unvegetated Vegetation Types			
Barren	22,300	1,100	23,000
Forest/Woodland Vegetation Types			
Closed-cone pine–cypress	—	300	300
Jeffrey pine	—	30	30
Juniper	—	32,000	32,000
Montane hardwood	—	300	300
Pinyon–juniper	63,000	10,100	73,000
Ponderosa pine	1,400	—	1,400
Sierran mixed conifer	—	100	100
Subalpine conifer	200	—	200
Grassland Vegetation Types			
Annual grassland	—	6,400	6,400
Riparian/Wetland Vegetation Types			
Desert wash/riparian	200	22,000	23,000
Freshwater emergent wetland	1,000	—	1,000
Lacustrine	20	80	100
Scrub and Chaparral Vegetation Types			
Alkali desert scrub	190,000	—	190,000
Chamise–redshank chaparral	—	8,300	8,300
Coastal scrub	—	10	10
Desert scrub	330,000	243,000	573,000
Desert succulent shrub	—	35,000	35,000
Joshua tree	19,000	2,500	21,000
Low sage	3,000	—	3,000
Mixed chaparral	10	13,000	13,000
Sagebrush	48,600	—	48,600
Other Land Covers			
Agricultural crop	400	3,600	4,000
Urban	—	1,400	1,400
Total	**379,000**	**679,000**	**1,058,000**

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the

totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

III.7.10.2.2 Special-Status Species

The species included in Table III.7-89 are those that have federal or state ranking as special-status species, as defined in Section III.7.6.4, that occur outside of the DRECP Plan Area on BLM LUPA lands.

Table III.7-89
Special-Status Species Outside of the DRECP Plan Area on BLM LUPA Lands

Common Name	Scientific Name	Federal Status[1]	State Status[2]	North	SW
Amphibians/Reptiles					
Agassiz's desert tortoise	*Gopherus agassizii*	FT	ST		X
Arroyo toad	*Anaxyrus californicus*	FE	CSC		X
Barefoot gecko	*Coleonyx switaki*	BLM	ST		X
Coast horned lizard	*Phrynosoma blainvillii*	—	CSC		X
Coachella fringe-toed lizard	*Rana muscosa*	FE	SC		X
Couch's spadefoot	*Scaphiopus couchii*	BLM	CSC		X
Rosy boa	*Charina trivirgata*	BLM, FS	—		X
Sierra Madre yellow-legged frog	*Rana muscosa*	FE	SC, CSC		X
Fish					
Desert pupfish	*Cyprinodon macularius*	FE	SE		X
Mohave tui chub	*Siphateles (Gila) bicolor mohavensis*	FE	SE		X
Birds					
Crissal thrasher	*Toxostoma crissale*	BLM, BCC	CSC		X
Gray vireo	*Vireo vicinior*	BLM, BCC	CSC	X	X
Inyo California towhee	*Melozone [=Pipilo] crissalis eremophilus*	FT	SE	X	
Le Conte's thrasher	*Toxostoma lecontei*	BLM	CSC	X	X
Least Bell's vireo	*Vireo bellii pusillus*	FE	SE		X
Loggerhead shrike	*Lanius ludovicianus*	BCC	CSC		X
Long-eared owl	*Asio otus*	BLM	CSC	X	
Southwestern willow flycatcher	*Empidonax extimus traillii*	FE	SE		X
Vermilion flycatcher	*Pyrocephalus rubinus*	—	CSC	X	X

Table III.7-89
Special-Status Species Outside of the DRECP Plan Area on BLM LUPA Lands

Common Name	Scientific Name	Federal Status[1]	State Status[2]	North	SW
Western snowy plover	*Charadrius alexandrinus nivosus*	FT	CSC	X	
Yellow warbler	*Dendroica petechia brewsteri*	BCC	CSC		X
Mammals					
American badger	*Taxidea taxus*	—	CSC	X	X
Big free-tailed bat	*Nyctinomops macrotis*	—	CSC		X
Hoary bat	*Lasiurus cinereus*	—	WBWG	X	
Long-eared myotis	*Myotis evotis*	BLM	—	X	
Nelson's bighorn sheep	*Ovis canadensis nelsoni*	BLM	FP	X	X
Palm Springs pocket mouse	*Perognathus longimembris bangsi*	BLM	CSC		X
Pocketed free-tailed bat	*Nyctinomops femorosaccus*	—	CSC		X
Spotted bat	*Euderma maculatum*	BLM	CSC	X	
Western mastiff bat	*Eumops perotis californicus*	BLM	CSC	X	X
Western small-footed myotis	*Myotis ciliolabrum*	BLM	—	X	
Western yellow bat	*Lasiurus xanthinus*	—	CSC		X
Plants					
Abrams' spurge	*Chamaesyce abramsiana*	—	(CRPR 2.2)		X
Amargosa beardtongue	*Penstemon fruticiformis* var. *amargosae*	BLM	(CRPR 1B.3)	X	
Annual rock-nettle	*Eucnide rupestris*	—	(CRPR 2.2)		X
Arizona pholistoma	*Pholistoma auritum* var. *arizonicum*	—	(CRPR 2.3)		X
Arizona spurge	*Chamaesyce arizonica*	—	(CRPR 2.3)		X
Ash Meadows buckwheat	*Eriogonum contiguum*	BLM	(CRPR 2.3)	X	
Bailey's greasewood	*Sarcobatus baileyi*	—	(CRPR 2.3)	X	
Barneby's phacelia	*Phacelia barnebyana*	—	(CRPR 2.3)	X	
Black bog-rush	*Schoenus nigricans*	—	(CRPR 2.2)	X	
Bristly scaleseed	*Spermolepis echinata*	—	(CRPR 2.3)		X
Brown turbans	*Malperia tenuis*	—	(CRPR 2.3)		X
California ayenia	*Ayenia compacta*	—	(CRPR 2.3)	X	

Table III.7-89
Special-Status Species Outside of the DRECP Plan Area on BLM LUPA Lands

Common Name	Scientific Name	Federal Status[1]	State Status[2]	North	SW
California satintail	*Imperata brevifolia*	—	(CRPR 2.1)	X	
California saw-grass	*Cladium californicum*	—	(CRPR 2.2)		X
Chaparral sand-verbena	*Abronia villosa* var. *aurita*	BLM	(CRPR 1B.1)		X
Charlotte's phacelia	*Phacelia nashiana*	BLM	(CRPR 1B.2)	X	
Chimney Creek nemacladus	*Nemacladus calcaratus*	—	(CRPR 1B.2)	X	
Coachella Valley milk-vetch	*Astragalus lentiginosus* var. *coachellae*	FE	(CRPR 1B.2)		X
Cove's cassia	*Senna covesii*	—	(CRPR 2.2)		X
Creamy blazing star	*Mentzelia tridentata*	BLM	(CRPR 1B.3)	X	
Curly herissantia	*Herissantia crispa*	—	(CRPR 2.3)		X
Cushenbury oxytheca	*Acanthoscyphus parishii* var. *goodmaniana*	FE	(CRPR 1B.1)		X
Death Valley sandpaper-plant	*Petalonyx thurberi* ssp. *gilmanii*	BLM	(CRPR 1B.2)	X	
Dedecker's clover	*Trifolium dedeckerae*	BLM	(CRPR 1B.3)	X	
Desert beauty	*Linanthus bellus*	—	(CRPR 2.3)		X
Desert spike-moss	*Selaginella eremophila*	—	(CRPR 2.2)		X
Dwarf germander	*Teucrium cubense* ssp. *depressum*	—	(CRPR 2.2)		X
Emory's crucifixion-thorn	*Castela emoryi*	—	(CRPR 2.2)		X
Forked buckwheat	*Eriogonum bifurcatum*	BLM	(CRPR 1B.2)	X	
Geyer's milk-vetch	*Astragalus geyeri* var. *geyeri*	—	(CRPR 2.2)	X	
Gilman's buckwheat	*Eriogonum gilmanii*	—	(CRPR 1B.3)	X	
Gilman's cymopterus	*Cymopterus gilmanii*	—	(CRPR 2.3)	X	
Gilman's goldenbush	*Ericameria gilmanii*	BLM	(CRPR 1B.3)	X	
Glandular ditaxis	*Ditaxis claryana*	—	(CRPR 2.2)		X
Greene's rabbitbrush	*Chrysothamnus greenei*	—	(CRPR 2.3)	X	
Hairy stickleaf	*Mentzelia hirsutissima*	—	(CRPR 2.3)		X
Hall's daisy	*Erigeron aequifolius*	BLM	(CRPR 1B.3)	X	
Harwood's milk-vetch	*Astragalus insularis* var. *harwoodii*	—	(CRPR 2.2)		X
Hoffmann's buckwheat	*Eriogonum hoffmannii* var. *hoffmannii*	BLM	(CRPR 1B.3)	X	

Table III.7-89
Special-Status Species Outside of the DRECP Plan Area on BLM LUPA Lands

Common Name	Scientific Name	Federal Status[1]	State Status[2]	North	SW
Holmgren's lupine	*Lupinus holmgrenianus*	—	(CRPR 2.3)	X	
Inflated Cima milk-vetch	*Astragalus cimae* var. *cimae*	—	(CRPR 1B.3)	X	
Intermontane lupine	*Lupinus pusillus* var. *intermontanus*	—	(CRPR 2.3)	X	
Inyo blazing star	*Mentzelia inyoensis*	BLM	(CRPR 1B.3)	X	
Inyo County star-tulip	*Calochortus excavatus*	BLM	(CRPR 1B.1)	X	
Inyo rock daisy	*Perityle inyoensis*	BLM	(CRPR 1B.2)	X	
Jackass-clover	*Wislizenia refracta* ssp. *refracta*	—	(CRPR 2.2)		X
Jacumba milk-vetch	*Astragalus douglasii* var. *perstrictus*	BLM	(CRPR 1B.2)		X
July gold	*Dedeckera eurekensis*	BLM	(CRPR 1B.3)	X	
Kelso Creek monkeyflower	*Mimulus shevockii*	BLM	(CRPR 1B.2)	X	
Kern Plateau bird's-beak	*Cordylanthus eremicus* ssp. *kernensis*	—	(CRPR 1B.3)	X	
Kern River evening-primrose	*Camissonia integrifolia*	BLM	(CRPR 1B.3)	X	
King's eyelash grass	*Blepharidachne kingii*	—	(CRPR 2.3)	X	
Knotted rush	*Juncus nodosus*	—	(CRPR 2.3)	X	
Lancaster milk-vetch	*Astragalus preussii* var. *laxiflorus*	—	(CRPR 1B.1)		X
Las Animas colubrina	*Colubrina californica*	—	(CRPR 2.3)		X
Latimer's woodland-gilia	*Saltugilia latimeri*	BLM	(CRPR 1B.2)		X
Little-leaf elephant tree	*Bursera microphylla*	—	(CRPR 2.3)		X
Long-stem evening-primrose	*Oenothera longissima*	—	(CRPR 2.2)	X	
Mexican hulsea	*Hulsea mexicana*	—	(CRPR 2.3)		X
Mormon needle grass	*Stipa arida [=Achnatherum aridum]*	—	(CRPR 2.3)	X	
Mountain Springs bush lupine	*Lupinus excubitus* var. *medius*	BLM	(CRPR 1B.3)		X
Muir's tarplant	*Carlquistia muirii*	BLM	(CRPR 1B.3)	X	
Nevada oryctes	*Oryctes nevadensis*	—	(CRPR 2.1)	X	

Table III.7-89
Special-Status Species Outside of the DRECP Plan Area on BLM LUPA Lands

Common Name	Scientific Name	Federal Status[1]	State Status[2]	North	SW
Nine Mile Canyon phacelia	*Phacelia novenmillensis*	BLM	(CRPR 1B.2)	X	
Orcutt's linanthus	*Linanthus orcuttii*	BLM	(CRPR 1B.3)		X
Orcutt's woody-aster	*Xylorhiza orcuttii*	BLM	(CRPR 1B.2)		X
Orocopia sage	*Salvia greatae*	BLM	(CRPR 1B.3)		X
Owens Peak lomatium	*Lomatium shevockii*	BLM	(CRPR 1B.3)	X	
Palmer's mariposa-lily	*Calochortus palmeri* var. *palmeri*	BLM	(CRPR 1B.2)	X	X
Panamint daisy	*Enceliopsis covillei*	BLM	(CRPR 1B.2)	X	
Panamint dudleya	*Dudleya saxosa* ssp. *saxosa*	BLM	(CRPR 1B.3)	X	
Panamint Mountains buckwheat	*Eriogonum microthecum* var. *panamintense*	BLM	(CRPR 1B.3)	X	
Panamint Mountains lupine	*Lupinus magnificus* var. *magnificus*	BLM	(CRPR 1B.2)	X	
Panamint rock-goldenrod	*Cuniculotinus gramineus*	—	(CRPR 2.3)	X	
Parish's daisy	*Erigeron parishii*	FT	(CRPR 1B.1)		X
Parish's desert-thorn	*Lycium parishii*	—	(CRPR 2.3)		X
Parry's monkeyflower	*Mimulus parryi*	—	(CRPR 2.3)	X	
Parry's spineflower	*Chorizanthe parryi* var. *parryi*	BLM	(CRPR 1B.1)		X
Pierson's milk-vetch	*Astragalus magdalenae* var. *peirsonii*	FT	SE		X
Pink fairy-duster	*Calliandra eriophylla*	—	(CRPR 2.3)		X
Pinyon Mesa buckwheat	*Eriogonum mensicola*	BLM	(CRPR 1B.3)	X	
Pinyon rockcress	*Boechera dispar*	—	(CRPR 2.3)	X	
Prairie wedge grass	*Sphenopholis obtusata*	—	(CRPR 2.2)	X	X
Pygmy lotus	*Acmispon haydonii*	—	(CRPR 1B.3)		X
Ripley's aliciella	*Aliciella ripleyi*	—	(CRPR 2.3)	X	
Robison's monardella	*Monardella robisonii*	BLM	(CRPR 1B.3)		X
Robbins' nemacladus	*Nemacladus secundiflorus* var. *robbinsii*	—	(CRPR 1B.2)		X
San Bernardino aster	*Symphyotrichum defoliatum*	BLM	(CRPR 1B.2)		X

Table III.7-89
Special-Status Species Outside of the DRECP Plan Area on BLM LUPA Lands

Common Name	Scientific Name	Federal Status[1]	State Status[2]	North	SW
San Bernardino milk-vetch	*Astragalus bernardinus*	BLM	(CRPR 1B.2)		X
San Diego button-celery	*Eryngium aristulatum* var. *parishii*	FE	SE, (CRPR 1B.1)	X	
Sanicle cymopterus	*Cymopterus ripleyi* var. *saniculoides*	BLM	(CRPR 1B.2)	X	
Santa Rosa Mountains leptosiphon	*Leptosiphon floribundus* ssp. *hallii*	—	(CRPR 1B.3)		X
Shockley's milk-vetch	*Astragalus serenoi* var. *shockleyi*	—	(CRPR 2.2)	X	
Shockley's rockcress	*Boechera shockleyi*	—	(CRPR 2.2)	X	X
Slender cottonheads	*Nemacaulis denudata* var. *gracilis*	—	(CRPR 2.2)		X
Slender-leaved ipomopsis	*Ipomopsis tenuifolia*	—	(CRPR 2.3)		X
Southern jewel-flower	*Streptanthus campestris*	BLM	(CRPR 1B.3)		X
Spanish needle onion	*Allium shevockii*	BLM	(CRPR 1B.3)	X	
Spear-leaf matelea	*Matelea parvifolia*	—	(CRPR 2.3)		X
Spiny-hair blazing star	*Mentzelia tricuspis*	—	(CRPR 2.1)		X
Sticky geraea	*Geraea viscida*	—	(CRPR 2.3)		X
Sweet-smelling monardella	*Monardella beneolens*	BLM	(CRPR 1B.3)	X	
Wheeler's dune-broom	*Chaetadelpha wheeleri*	—	(CRPR 2.2)	X	
White-bracted spineflower	*Chorizanthe xanti* var. *leucotheca*	BLM	(CRPR 1B.2)		X
Wildrose Canyon buckwheat	*Eriogonum eremicola*	BLM	(CRPR 1B.3)	X	
Yellow ivesia	*Ivesia arizonica* var. *arizonica*	—	(CRPR 2.3)	X	

Sources: CDFW 2013a and CBI 2013.

North = North of the DRECP Plan Area region; SW = Southwest of the DRECP Plan Area region

[1] Federal Status – FE: Federally Endangered; FT: Federally Threatened; FD: Federally Delisted; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern; Eagle Act: Bald and Golden Eagle Protection Act.

[2] State Status – SE: California Endangered; ST: California Threatened; SC: California Candidate for listing; CSC: California Species of Special Concern; FP: Fully Protected; WBWG: Western Bat Working Group species. California Rare Plant Rank (CRPR, formerly known as the CNPS List) - CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere.

Critical Habitat for Special-Status Species

Six special-status species have critical habitat within BLM lands outside the DRECP Plan Area. Table III.7-90 details these species and the total amount of critical habitat present.

Table III.7-90
Critical Habitat for Special-Status Species Within BLM LUPA Lands Outside the DRECP Plan Area

Common Name	Scientific Name	Federal Status[1]	State Status[2]	Acres of Critical Habitat within the BLM LUPA Lands Outside the DRECP Plan Area
Reptiles				
Coachella Valley fringe-toed lizard	*Uma inornata*	FE	SC	12,000
Agassiz's desert tortoise	*Gopherus agassizii*	FT	ST	173,000
Birds				
Inyo California towhee	*Melozone [=Pipilo] crissalis eremophilus*	FT	SE	4,000
Least Bell's vireo	*Vireo bellii pusillus*	FE	SE	600
Mammals				
Bighorn sheep (Peninsular Ranges DPS)	*Ovis canadensis nelsoni*	FE, BLM	ST, FP	317,000
Plants				
Coachella Valley milk-vetch	*Astragalus lentiginosus* var. *coachellae*	FE	(CRPR 1B.2)	10,000

[1] Federal Status – FE: Federally Endangered; FT: Federally Threatened; FS: USFS Sensitive; BLM: Bureau Land Management Sensitive; BCC: USFWS Bird of Conservation Concern.

[2] State Status – SE: California Endangered; ST: California Threatened; CSC: California Species of Special Concern; FP: Fully Protected. CRPR: California Rare Plant Rank (formerly known as the CNPS List)–CRPR 1B: Considered rare, threatened, or endangered in California and elsewhere; CRPR 2: Considered rare, threatened, or endangered in California, but more common elsewhere.

Note: The following general rounding rules were applied to acreage values: values greater than 1,000 were rounded to nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

III.7.10.2.3 Landscape Habitat Linkages and Wildlife Movement Corridors

Landscape habitat linkages and wildlife movement corridors are present within the north of the DRECP Plan Area and southwest of the DRECP Plan Area regions. While the north–south situated Owens Valley acts as the primary corridor in the north of the DRECP Plan Area region, there are smaller canyons and valleys that generally run northeast–southwest

through the Inyo Mountains that provide linkages for wildlife and habitat between the Owens Valley and lands in Nevada.

The Coachella Valley hosts a number of corridors in the southwest of the DRECP Plan Area region. Coachella Valley itself provides a corridor for wildlife movement toward the Salton Sea and Borrego Valley. Morongo Canyon is a critical corridor that allows for movement between Coachella Valley and Yucca Valley, by providing passage between the San Bernardino Mountains and Joshua Tree National Park. In addition, the San Gorgonio River and associated tributaries provide value as a biological corridor between the San Bernardino Mountains and the San Jacinto Mountains (CVAG 2007).

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III.8 CULTURAL RESOURCES

This chapter presents the Affected Environment for the Land Use Plan Amendment (LUPA) Decision Area and the Desert Renewable Energy Conservation Plan (DRECP) area for cultural resources. These areas overlap, and in the following programmatic discussion are referred to broadly as the "California Desert Region." More than 32,000 cultural resources are known in the DRECP area in every existing environmental context – from mountain crests to dry lake beds – and include both surface and subsurface deposits.

Cultural resources are categorized as buildings, sites, structures, objects, and districts (including cultural landscapes and Traditional Cultural Properties) under the federal National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA). Historic properties are cultural resources included in, or eligible for inclusion in, the National Register of Historic Places (NRHP), maintained by the Secretary of the Interior (36 Code of Federal Regulations [CFR] 60.4). See Section III.8.1.1 for more information on federal regulations and historic properties.

This chapter discusses three types of cultural resources classified by their origins: prehistoric, ethnographic, and historic.

Prehistoric cultural resources are associated with the human occupation of California prior to prolonged European contact. These resources may include sites and deposits, structures, artifacts, rock art, trails, and other traces of Native American human behavior. In California, the prehistoric period began over 12,000 years ago and extended through the eighteenth century until 1769, when the first Europeans settled in California.

Ethnographic resources represent the heritage of a particular ethnic or cultural group, such as Native Americans or African, European, Latino, or Asian immigrants. They may include traditional resource-collecting areas, ceremonial sites, value-imbued landscape features, cemeteries, shrines, or ethnic neighborhoods and structures. Ethnographic resources may include historic period Native American resources.

Historic-period cultural resources, both archaeological and built-environment, are associated with Euro-American exploration and settlement of an area and the beginning of a written historical record. They may include archaeological deposits, sites, structures, traveled ways, artifacts, or other evidence of human activity. Groupings of historic-period archaeological and built-environment resources are also recognized as both historic districts and historic vernacular landscapes.

Descriptions and examples of these cultural resource categories are provided in Section III.8.2, Cultural Resources Background and Context. This chapter also identifies federal laws and regulations that help protect cultural resources. Cultural resources within the

DRECP area are described on a programmatic level and identified by DRECP ecoregion subarea.

III.8.1 Regulatory Setting

The following summarizes federal regulations relevant to the protection of cultural resources. Regulations appear in this order: acts, Executive Orders, Secretarial Orders, bills, and codes. Within each of these categories, individual laws and regulations are organized by enactment date.

III.8.1.1 Antiquities Act of 1906 (16 United States Code (U.S.C.) 431-433)

This act authorizes the president to designate as national monuments historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest on lands owned or controlled by the United States. The act allows the Secretaries of the Interior, Agriculture, and War (now Army) to issue permits for the examination of ruins, excavation of archaeological sites, and the gathering of objects of antiquity on lands under respective jurisdictions and identifies penalties for violations.

III.8.1.2 National Historic Preservation Act of 1966 as Amended (NHPA) (Public Law [PL] 89-665; 54 U.S.C.300101)

The NHPA requires each state to appoint a State Historic Preservation Officer (SHPO) and authorizes tribes to appoint Tribal Historic Preservation Officers (THPOs) to direct and conduct a comprehensive state- or reservation-wide survey of historic properties and maintain an inventory of them to provide lead agencies with comments on Section 106 undertakings, among other responsibilities. This act also created the Advisory Council on Historic Preservation (ACHP), which provides national oversight and dispute resolution. Further, the act established the NRHP and charged the National Park Service with maintaining it and promulgating policies and guidelines for identifying, documenting, nominating, protecting, preserving, and restoring historic properties that may be eligible for the NRHP. This act also has provisions that ensure the confidentiality of information about sensitive cultural resources.

Sections 106 and 110 of this act provide specific guidelines on both federal agency historic preservation and management of historic properties. Section 106 requires that federal agencies consider their undertakings on historic properties and afford the ACHP a reasonable opportunity to comment on those undertakings. Under Section 106, an undertaking collectively refers to all projects, activities, or programs funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency, those carried out by federal financial assistance, and by those requiring a federal permit, license, or other approval.

Federal agencies must meet their Section 106 responsibilities in the regulations (36 Code of Federal Regulations [CFR] Part 800). Federal agencies must conduct the necessary studies and consultations to identify cultural resources that may be affected by an undertaking, evaluate cultural resources that may be affected to determine if they are eligible for the NRHP (that is, whether identified resources constitute historic properties), and assess whether such historic properties would be adversely impacted. Historic properties are resources either listed on or eligible for listing on the NRHP (36 CFR 800.16[l][1]). A property may be listed in the NRHP if it meets criteria provided in the NRHP regulations (36 CFR 60.4). Properties must typically be 50 years or older (36 CFR 60.4[d]).

The quality of significance in American history, architecture, archaeology, engineering, and culture can be in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, or association (see Section 18.2.2.1) and:

a. That are associated with events that have made a significant contribution to the broad patterns of our history.
b. That are associated with the lives of persons significant in our past.
c. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess artistic value, or that represent a significant and distinguishable entity whose components may lack individual distinction.
d. That have yielded, or may be likely to yield, information important in prehistory or history.

Some property types that do not typically qualify for the NRHP can still qualify if they fall within the following parameters (36 CFR 60.4):

a. A religious property deriving primary significance from architectural or artistic distinction or historical importance
b. A building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event
c. A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with [the person's] productive life.
d. A cemetery which derives its primary significance from graves of persons of transcendent importance from age, from distinctive design features, or from association with historic events

e. A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived

f. A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance

g. A property achieving significance within the past 50 years if it is of exceptional importance

Section 106 defines an adverse effect as an effect that alters, directly or indirectly, the characteristics that make a resource eligible for listing in the NRHP (36 CFR 800.5[a][1]). Consideration must be given to the property's location, design, setting, materials, workmanship, feeling, and association, to the extent that these characteristics contribute to the integrity and significance of the resource. Adverse effects may be direct and reasonably foreseeable or may be more remote in time or distance (36 CFR 8010.5[a][1]).

The federal agency is required to consult with SHPO(s)/THPO(s); Indian tribes (federally recognized) and Native Hawaiian organizations; representatives of local governments; applicants for federal assistance, permits, licenses, and other approvals; and additional interested parties (e.g., the public). These parties may participate in the entire Section 106 process, including identifying historic properties, assessing adverse effects, and resolving conflicts. The California SHPO and the ACHP strongly suggest that Indian tribes not federally recognized be consulted as "other interested parties" under 36 CFR Section 800.2(c)(5), or as members of the public 800.2(d).

III.8.1.2.1 BLM Role and Responsibility under Section 106 of the NHPA

Under the Proposed LUPA, the BLM issues rights-of-way (ROWs) to applicants who submit acceptable Plans of Development (36 CFR Part 800.16[y]) for lands administered by BLM. Cultural resources within an Area of Potential Effects (APE) for renewable energy projects approved or authorized by BLM within the LUPA Decision Area would be either evaluated or assumed eligible for inclusion in the NRHP. To date, BLM has been actively involved in consulting with federally recognized tribes to identify cultural resources located within BLM's APE for the Proposed LUPA and highlight any concerns with historic properties that may be affected. A Programmatic Agreement has been developed that establishes the process BLM will follow to fulfill its responsibilities under Section 106 of the NHPA for site-specific, renewable energy application decisions implemented in accordance with BLM LUPA. The Programmatic Agreement establishes conditions applicants must identify, evaluate for significance, and assess the effects of to historic properties, and to mitigate any adverse effects under 36 CFR 800, in consultation with the public and SHPO.

Additional details regarding the Programmatic Agreement are provided in the Consultation and Coordination section in Volume V of this document.

III.8.1.2.2 BLM State Protocol Agreement with the California State Historic Preservation Officer and the Nevada State Historic Preservation Officer (2014)

This agreement outlines how the BLM and the SHPO shall cooperatively implement the National Programmatic Agreement and NHPA, Section 106, in California and in portions of Nevada that are managed by BLM. The protocol streamlines Section 106 by eliminating case-by-case consultation with the SHPO on certain types of undertakings that result in "no historic properties affected" (36 CFR 800.4[d][1]) or "no adverse effect" findings (36 CFR 800.5[b]) (BLM 2014). Large-scale renewable energy projects are specifically excluded from the protocol and reviewed under the 36 CFR Part 800 regulations or other Programmatic Agreement.

III.8.1.2.3 BLM National Programmatic Agreement with the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers (2012)

This agreement, revised in 2012, "provided a systematic basis for identifying, evaluating, and nominating to the National Register historic properties under the bureau's jurisdiction or control for managing and maintaining properties listed in or eligible for the National Register in a way that considers the preservation of their archaeological, historical, architectural, and cultural values and the avoidance of adverse effects in light of the views of local communities, Indian tribes, interested persons, and the general public; and that gives special consideration to the preservation of such values in the case of properties designated as having National significance" (BLM 2012). The agreement maintains a Preservation Board to advise the director, assistant directors, state directors, and field-office managers in the development and implementation of BLM's policies and procedures for historic properties. The agreement also directs state directors to establish protocols with the applicable SHPO, specifying how they will operate and interact under the programmatic agreement.

III.8.1.2.4 Programmatic Agreement among the U.S. Department of the Interior, BLM, the Arizona SHPO, the California SHPO, the Colorado SHPO, the New Mexico SHPO, the Nevada SHPO, the Utah SHPO, and the Advisory Council on Historic Preservation Regarding Solar Energy Development on Lands Administered by the BLM (2012)

This agreement establishes the process BLM will follow to fulfill its responsibilities under Section 106 of the NHPA for site-specific, solar application decisions that are implemented

in accordance with the decisions supported by both the Solar Programmatic Environmental Impact Statement (Solar PEIS) and BLM policy.

III.8.1.2.5 Section 110 of the NHPA

Section 110 of the NHPA (16 U.S.C. 470h-2) generally provides that all federal agencies assume responsibility for the preservation and use of historic properties owned or controlled by those agencies. Under Section 110, federal agencies must establish a preservation program for the identification, evaluation, and nomination to the NRHP and for protection of historic properties. The act also includes particular provisions for assuring the confidentiality of sensitive cultural resources information.

III.8.1.3 National Trails System Act of 1968 (16 U.S.C. 1241 et seq.)

This act created a series of National Trails "to promote the preservation of, public access to, travel within, and enjoyment and appreciation of the open-air, outdoor areas and historic resources of the Nation." Specifically, the act authorized three types of trails: National Scenic Trails, National Recreation Trails, and connecting and side trails. In 1978, as a result of the study of trails that were most significant for their historic associations, a fourth category of trail was added: National Historic Trails.

A National Historic Trail is a congressionally designated trail that is an extended, long-distance trail, not necessarily managed as continuous, that follows as closely as possible the original trails or routes of travel of national historic significance. The purpose of a National Historic Trail is the identification and protection of the historic route and the historic remnants and artifacts for public education and enjoyment. A National Historic Trail is managed to protect the nationally significant resources, qualities, values, and associated settings of the areas through which the trails pass, including the primary use or uses of the trail. Segments of the Old Spanish and Juan Bautista de Anza National Historic Trails are located within the DRECP area.

III.8.1.4 National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.)

NEPA is designed to (1) encourage productive and enjoyable harmony between [humans and their] environment, (2) promote efforts that will prevent or eliminate damage to the environment and biosphere and stimulate [human] health and welfare, (3) enrich the understanding of the ecological systems and natural resources important to the nation, and (4) establish a Council on Environmental Quality. NEPA outlines federal governmental responsibilities for assuring that all Americans can enjoy safe, healthful, productive, and aesthetically and culturally pleasing surroundings. NEPA also aims to ensure the preservation of important historic, cultural, and natural aspects of our national heritage, among other objectives. NEPA directs federal agencies to conduct systematic,

interdisciplinary evaluations of the environmental impacts of proposed actions and alternatives. NEPA is an important tool for considering cultural and Native American interests, especially those that do not fall within the NHPA Section 106 authority.

III.8.1.5 Federal Land Policy Management Act (FLPMA) of 1976 (43 U.S.C. 1701 et seq.)

The Federal Land Policy Management Act of 1976 established public land policy and guidelines for the administration, management, protection, development, and enhancement of public lands. In accordance with Section 103(c) of FLPMA, public lands are to be managed for multiple use and sustained yield. This includes a combination of balanced and diverse resource uses that considers the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific, archaeological, and historical resource values. Public lands are to be managed by (1) using planning guidelines based on multiple use areas, including the protection of the above resources, and (2) reconciling competing demands.

Title VI of this act established several Designated Management Areas, including the California Desert Conservation Area (CDCA) and BLM Wilderness Study Areas. Section 601 of FLPMA defines the CDCA and provides guidelines for the creation of a comprehensive, long-range plan for the management, use, development, and protection of public lands within the CDCA.

Appendix VII of the CDCA Final Environmental Impact Statement describes the Cultural Resource Element of the CDCA and outlines the methods employed by BLM for gathering cultural resources data in the California Desert. Intensive surveys and fieldwork in sampling regions (e.g., Western Mohave, Eastern Colorado) of the California Desert were carried out in the late 1960s and 1970s. Inventories identified 2,903 sites and classified them into types, including village, temporary camp, shelter/cave, and milling station. Sites were also classified by their landforms, including mountain, hill, terrace, and ridge. After the inventory, the data were collected, digitized and mapped and used to generate cultural resource sensitivity maps. The criteria levels of sensitivity are (1) very high, (2) high, and (3) moderate, low, or of unknown sensitivity/significance.

III.8.1.6 Archaeological Resources Protection Act of 1979 (16 U.S.C. 470 aa-mm)

This act protects archaeological resources on public and Indian lands and acknowledges that archaeological resources are an irreplaceable part of America's heritage. This act applies when a project may involve archaeological resources located on federal or tribal land. The act requires that a permit be obtained before excavating to ensure that recovered

artifacts are appropriately curated. The act also provides for notification of Indian tribes when sites of cultural or religious importance could be harmed. This act establishes civil and criminal penalties for the unpermitted excavation, removal, damage, alteration, or defacement of archaeological resources on public or Indian lands. The act also has particular provisions for assuring the confidentiality of sensitive cultural resources information for archaeological excavation (PL 96-95, 16 U.S.C. 470aa-mm et seq.).

III.8.1.7 Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001-13)

This act establishes requirements for the treatment of Native American human remains, associated and unassociated funerary objects, sacred objects, and objects of cultural patrimony on federal and tribal land. The act defines the ownership of human remains and associated and unassociated funerary objects and objects of cultural patrimony, giving priority to lineal descendants and Indian tribes (43 CFR 10). In the event of an inadvertent discovery of remains or items, work shall stop in the immediate area and the inadvertent discovery protected. The federal agency is required to notify and consult with tribes that are, or likely to be, culturally affiliated with the remains and/or associated funerary objects.

Upon a valid repatriation request, the federal agency is required to return any such items to the lineal descendant(s) or specific Tribe with which the items are associated. The act and its implementing regulations contain similar noticing, consulting, and repatriation provisions for planned archaeological excavations (25 U.S.C. 3002[3][c]; 43 CFR 10.3). The act also has particular provisions for assuring the confidentiality of sensitive cultural resources information.

III.8.1.8 Omnibus Public Lands Management Act of 2009 (PL 111-11)

Congress established the National Landscape Conservation System (NLCS), which was created in June 2000 by the Department of the Interior (DOI) and BLM to "conserve, protect and restore nationally significant landscapes that have outstanding cultural, ecological, and scientific values for the benefit of current and future generations." The NLCS includes areas administered by the BLM such as national monuments, conservation areas, wilderness study areas, scenic trails or historic trails designated as a component of the National Trails System, components of the National Wild and Scenic Rivers System, components of the National Wilderness Preservation System, and public land within the CDCA-administered by the BLM for conservation purposes (Section 202).

Inclusion in the NLCS does not create any new legal protections for the lands already designated as national monuments, conservation areas, wilderness study areas, scenic trails or historic trails designated as a component of the National Trails System,

components of the National Wild and Scenic Rivers System or components of the National Wilderness Preservation System. Inclusion in the NLCS system creates new legal protections through a land use plan for conservation lands in the CDCA. The BLM will use the Proposed LUPA to define which lands within the CDCA are included in the NLCS.

III.8.1.9 Executive Order 11593 Protection and Enhancement of the Cultural Environment (1971)

This Executive Order established that federal agencies shall provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the nation. Agencies shall identify, inventory, and nominate to the Secretary of the Interior, all sites, buildings, districts, and objects under their jurisdiction or control that appear to qualify for listing on the NRHP no later than July 1, 1973. Agencies shall develop measures to preserve and maintain federally and non-federally owned sites, structures, and objects of historical, architectural, or archaeological significance.

III.8.1.10 Executive Order 13007 Indian Sacred Sites (1996)

Executive Order 13007 mandates that federal lands and executive branch agencies shall, to the extent practicable, permitted by law, and not inconsistent with essential agency functions, manage to accommodate Indian religious practitioners' access to and ceremonial use of Indian sacred sites. Agencies are to avoid adversely affecting the physical integrity of these sites, maintain the confidentiality of such sites, and inform and consult on a government-to-government basis with tribes concerning any proposed actions or land management policies that may restrict future access to, or ceremonial use of, or otherwise adversely affect the physical integrity of sacred sites.

III.8.1.11 Executive Order 13287 Preserve America (2003)

Executive Order 13287 established that agencies shall provide leadership in preserving America's heritage by actively advancing the protection, enhancement, and contemporary use of the historic properties owned by the federal government. Each agency is to provide and maintain an assessment of the status of its inventory of historic properties and their contribution to community economic development initiatives.

The Executive Order requires that, where consistent with its mission and governing authorities, and where appropriate, agencies shall seek partnerships with state and local governments, Native American tribes, and the private sector to (1) promote the unique cultural heritage of communities and of the nation and to realize the economic benefit that these properties can provide, and (2) cooperate with communities to increase opportunities for public benefit from, and access to, federally owned historic properties.

III.8.1.12 Secretarial Order No. 3330 Improving Mitigation Policies and Practices of the Department of the Interior (2013)

This order directs DOI agencies to develop department-wide mitigation strategies that will ensure consistency and efficiency in the review and permitting of infrastructure development projects, particularly developments intended to combat climate change, but could also impact natural and cultural resources. Strategies should use a landscape approach to identify and facilitate investment in key conservation priorities. Such mitigation strategies should be integrated early on in the planning process.

Mitigation measures should be durable, and the mitigation decisions should be consistent and transparent. In response to this order, DOI published "A Strategy for Improving the Mitigation Policies and Practices of the Department of the Interior." This document provides guidelines for achieving a more effective mitigation policy and describes policies and procedures "necessary to successfully shift from project-by-project management to consistent, landscape-scale, science-based management of the lands and resources for which the Department is responsible" (BLM 2014).

III.8.2 Cultural Resources Background and Context

Cultural resources consist of prehistoric, ethnographic, and historic-period resources. The evaluations of these cultural resources, in accordance with the criteria established by the federal and state legislation and regulations described earlier, are made within a historic context. A historic context is defined as "the patterns or trends by which a specific occurrence, property, or site is understood and its meaning (and ultimately its significance) within history or prehistory is made clear" (National Parks Service [NPS] 1995). Key aspects include the kinds of resources present in a specific region and how these resources change through time.

To describe the historic context of the LUPA Decision Area and DRECP area, referred to in this section as the "California Desert Region," a variety of sources were consulted including scholarly journals and books, archaeological reports, environmental documents, websites, and museum manuscripts. The following discussion defines key terms, identifies regional resource types, and outlines time periods in the California Desert Region. Additional research, records search, field survey and documentation, and Native American consultation at the regional and project-specific levels should supplement this general programmatic level context during project-specific review.

III.8.2.1 Resource Types and Definitions

Following are definitions of key resource types discussed in this chapter:

Cultural resources is a broad term that encompasses historic and prehistoric archaeological sites, objects, structures, buildings and places and areas of traditional importance typically of concern to Native American groups and other ethnic groups.

Historic properties are cultural resources included in, or eligible for inclusion in, the NRHP and may include any prehistoric or historic district, site, building, structure, traditional cultural property, or object. This term includes artifacts, records, and remains related to and located within such properties. The term also includes NRHP-eligible properties of traditional religious and cultural importance to a Native American Tribe that meets the NRHP criteria.

The **built environment,** broadly speaking, can be defined as "all space purposefully shaped and manipulated by human activity" (King 2011). As a class of resources, the built environment can include buildings, structures, objects, and sites that individually and collectively, as districts, reflect human history (King 2011).

Prehistoric cultural resources include archaeological sites such as lithic scatters/ workshops, ceramic scatters, ground stone scatters, habitation sites or temporary camps, cremations/burials, prehistoric trails, stone quarries, bedrock milling features, rock art, architectural features, and rock features (adapted from Office of Historic Preservation 1995). Prehistoric cultural resources may be considered traditional cultural properties or may contribute to cultural landscapes or traditional cultural properties.

- Lithic scatters: sites containing chipped or flaked stones resulting from human manipulation. The number of artifacts that define a site vary and should be identified in consultation with appropriate state and federal agencies. Artifacts found in lithic scatters include flakes (those pieces of stone left over from creating a stone tool) or assay of rock for the purpose of manufacturing stone tools, or flaked stone artifacts such as projectile points.
- Ceramic scatters: a collection of potsherds.
- Ground stone scatters: a collection of ground or pecked stone artifacts.
- Habitation site or temporary camp: a wide range of artifact types that may have features such as hearths/campfires and/or bedrock milling features where seeds and grasses were ground.
- Cremation: human remains/bones that have been burned to the point of calcification.

- Prehistoric trail: a linear feature formed through repetitive human use.
- Quarry: a source of lithic material with evidence of human use.
- Bedrock milling feature: bedrock mortars (bowl-like depression in bedrock in which seeds and other materials were ground with a pestle or cylindrical stone), or milling surfaces that indicate material processing activity such as grinding seeds or grasses.
- Rock art: pictographs, petroglyphs, and geoglyphs. Pictographs include any design painted on a rock surface. Petroglyphs contain a stone surface that has been scored by humans in a patterned manner for a purpose other than material processing. Geoglyphs or intaglios are works of art made from moving stones to expose cleared ground.
- Architectural features: any feature that indicates the presence of human construction activity such as fish traps and house rings.
- Rock feature: a patterned arrangement of rocks purposefully constructed.
- Isolates or isolated finds: one or two artifacts with no other associated features or artifacts.

Ethnographic resources are best defined in National Park Service Director Order #28 as "variations of natural resources and standard cultural resource types" that "are subsistence and ceremonial locales and sites, structures, objects, and rural and urban landscapes assigned cultural significance by traditional users" (NPS 1998). Director Order #28 also states that, "The decision to call resources 'ethnographic' depends on whether associated peoples perceive them as traditionally meaningful to their identity as a group and the survival of their lifeways" (NPS 1998). Ethnographic resources can also include traditional cultural properties, sacred sites, cultural landscapes, heritage resources, or historic properties that are areas or places.

Traditional cultural properties (TCPs) are defined in NPS Bulletin 38 as a property "that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that are rooted in that community's history and are important in maintaining the continuing cultural identity of the community" (Parker and King 1998). TCPs can be associated with any cultural group; however, those associated with Native American groups are the most common. Examples of Native American TCPs include locations associated with traditional beliefs of Native American groups about their origin, cultural history, or the nature of the world; traditional cultural practices such as plant gathering; or locations where Native American religious practitioners have traditionally gone and are known or thought to currently go to perform ceremonial activities according to their traditional cultural rules of practice. The TCPs on land

administered by BLM may be identified through BLM's ongoing consultation with Native American tribes and or any other interested parties.

Sacred sites are defined under Executive Order 13007 as:

> "...any specific, discrete, narrowly delineated location on federal land that is identified by an Indian Tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the Tribe or appropriately authoritative representative of an Indian religion has informed the agency of the existence of such a site."

Under EO 13007, federal agencies are required (to the extent practicable, permitted by law, and not clearly inconsistent with essential agency functions) to accommodate access to and ceremonial use of such sites on federal lands by Indian religious practitioners and avoid affecting the physical integrity of such sacred sites regardless of whether the sacred site qualifies as a historic property.

Cultural landscapes are defined by the NPS in National Parks Service Preservation Brief 36 as "geographic area[s], including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values" (Birnbaum 1994). Cultural landscapes may include TCPs as contributing elements.

The NPS has defined four types of cultural landscapes that are not mutually exclusive: (1) historic sites are significant for their association with a historic event, activity, or person; (2) historic-designed landscapes were consciously designed or laid out by a landscape architect, master gardener, architect, or horticulturist according to design principles, or by an amateur gardener working in a recognized style or tradition; (3) historic vernacular landscapes evolved through use by the people whose activities or occupancy shaped it through social or cultural attitudes of an individual, a family, or community, and the landscape reflects the physical, biological, and cultural character of everyday lives; and (4) ethnographic landscapes contain a variety of natural and cultural resources that associated people define as heritage resources (Birnbaum 1994). Note that in the NPS's usage, cultural landscapes can conform to more than one of the NRHP property types: site, building, structure, or district (Birnbaum 1994).

The NPS is not the only agency to recognize the importance of cultural landscapes. For example, BLM guidance regarding land use planning emphasizes the importance of using social science information for resource planning decisions; one of the relevant social science aspects highlighted in this particular document is the analysis of "how

people interact with the landscape and sense of place issues" (BLM 2005). More recently, BLM defined a landscape as "a large area encompassing an interacting mosaic of ecosystems and human systems that is characterized by a set of common management concerns" (BLM 2014).

The importance of cultural landscapes has also been recognized by the California Office of Historic Preservation (OHP). The OHP's Statewide Historic Preservation Plan, 2013-2017, advocates analyzing archaeological and ethnographic information together in the identification and evaluation phases of cultural landscape documentation. Moreover, OHP has specifically called out a need for cultural resources professionals working on renewable energy projects to shift focus from the site level to the landscape level of assessment (OHP 2013).

Historic-period archaeological resources are archaeological deposits, foundations, and other remains of human activity that were produced during the historic-period. Some examples of historic-era archaeological resources are camps, roads, trails, mines, railroads, graveyards, trash scatters, and military refuse. Camps are associated with a single activity like mining or railroad construction, and they are transient. Saddle trails and wagon roads are examples of roads and trails. Shafts, adits, tunnels, and buildings for habitation or storage are associated with mining activities. Trash scatters are made of discarded materials such as glass bottles, food cans, and construction debris. Military sites consist of remnants of military activities that include forts, camps, and outposts (BLM 1980). Historic-period archaeological resources may be considered traditional cultural properties or may contribute to cultural landscapes or traditional cultural properties.

Historic-period built-environment resources are elements of the built-environment, namely buildings, structures, and objects that were constructed during the historic period. Examples of historic built-environment resources are town sites or districts, homesteads, canals, highways, single-family properties, and adobes. Town sites have evidence of permanent buildings and a wide range of activities. Homesteads have single-family homes or farmhouses and sometimes cultivated plots. Waterways and transmission lines are linear historic structures. Remnants of any of these built-environment resources are historic period archaeological resources. Historic-period built-environment resources may be traditional cultural properties or may contribute to cultural landscapes or traditional cultural properties.

III.8.2.2 Prehistory

The prehistory of the California Desert Region spans four general temporal periods: Late Pleistocene and Early, Middle, and Late Holocene. In light of the many cultural sequences, the temporal periods are described below.

Late Pleistocene (20,000 to 10,000 BP[1])

Human occupation before the Paleo-Indian Period has recently been established in North and South America (Erlandson et al. 2007). Prior to this study, some archaeologists had argued that a Californian pre-Clovis occupation existed, citing several sites within the California Desert Region including the Yuha Pinto Wash, Lake Manix, Calico Hill, and China Lake sites (Davis et al 1980). However, the dates assigned to these sites were obtained from questionable materials so resulted in the archaeological community's skepticism of a pre-Clovis occupation in California (Erlandson et al. 2007; Sutton et al 2007). This point of view is changing with the acceptance of the Monte Verde site in Chile, dating to 14,300 BP (before the present), the Paisley Caves in Oregon, dating as early as 14,300 BP (Jenkins 2012), and the discovery of two sites (Arlington Man and Daisey Cave) on the Northern Channel Islands dating as early as 12,700 BP and 11,500 BP, respectively. To date, no sites conclusively dated to the pre-Clovis period have been identified within the California Desert Region (Erlandson et al. 2007; Schaefer and Laylander 2007; Sutton et al. 2007).

Human occupation during the Late Pleistocene has been termed the Paleo-Indian Period. The earliest part of the Paleo-Indian Period in the California Desert Region, represented by the Clovis Complex, is characterized by the Fluted Point Tradition. The artifact assemblage for this tradition is characterized by lanceolate bifaces (blade edges) with edge-ground concave bases and at least one central flake-scar running from the bottom to the tip of the biface. However, the dates for these points are problematic in the Great Basin and California because no fluted points in California have been associated with radiocarbon dates nor found in association with Pleistocene fauna (Rondeau et al. 2007). Obsidian hydration measurements have been used to date fluted points in the Mojave Desert (Sutton et al. 2007). Fluted points are typically found on the surface and rarely in buried contexts, and have been identified more often to the north and west than in other parts of the Mojave Desert. Significant concentrations of these points appear in the drainage basins of the Pleistocene China and Thompson lakes (Sutton et al. 2007).

Olivella shell beads from several sites within the California Desert Region, including the Stahl Site (CA-INY-182) in Inyo County, one site in Riverside County (CA-RIV-521), and the Goldstone, Awl, Rodgers Ridge, and Flood Pond sites in San Bernardino County (CA-SBR-2348, CA-SBR-4562, CA-SBR-5250, and CA-SBR-5251) have yielded radiocarbon dates within the Late Pleistocene range and indicate trade networks with coastal peoples. These sites were located adjacent to lakes or marshes (Erlandson et al. 2007; Fitzgerald et al. 2005; Sutton et al. 2007). Artifacts include debitage (waste materials produced during the manufacture of stone tools) and leaf-shaped bifaces (Moratto 1984).

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1 BP is an abbreviation for "Before Present," which by conventional use is 1950 AD.

Traditionally, the people during the terminal Pleistocene were thought to be mobile big-game hunters; however, recent studies suggest that their economies were more diverse and focused on smaller animals and plant foods, and that large game played a minor role (Erlandson et al. 2007). They lived in small populations in temporary camps located near permanent water sources (Sutton et al. 2007). Some researchers posit a terminal Pleistocene presence in the Colorado Desert based on undated, heavily patinated cores or scrapers and sleeping circles (Schaefer and Laylander 2007).

Early Holocene (10,000 to 8,000 BP)

The best known archaeological complex during the Early Holocene is the Lake Mojave Complex. It spanned a period approximately 10,000 to 8,000 years ago. The Lake Mojave Complex consists of projectile points of the Great Basin stemmed series and abundant bifaces, along with steep-edged unifaces, crescents, and occasional cobble-core tools and ground stone implements. These sites tend to be surficial deposits found around fossil pluvial lakeshores such as Lake Mojave and China Lake. People of the Lake Mojave Complex adapted to wetland environments and both hunted and gathered. Site types in the Mojave Desert include residential bases, lithic workshops, and small camps. The people lived in small social units that used a forager-like strategy and revisited the same locations. In addition, a few reliable radiocarbon dates have been obtained from identified Lake Mojave Complex sites; however, some radiocarbon dates for these sites also exist from Lake Mojave, Fort Irwin, Twentynine Palms, Rosamond Lake, and China Lake. (Sutton et al. 2007). Sites attributed to this period in the Colorado Desert are sleeping circles and heavily patinated scrapers or cores; both kinds of archaeological material still lack solid chronological verification. As noted previously, these sites may have occurred during the terminal Pleistocene (Schaefer and Laylander 2007).

Middle Holocene (8000 to 5000 BP)

The Middle Holocene is characterized by the Pinto Complex (8,000 to 5,000 BP) in the California Desert Region. Radiocarbon data from some sites in the Mojave Desert suggest that there was an overlap between the Lake Mojave and Pinto complexes and that the Pinto Complex may have begun in the Early Holocene (Sutton et al. 2007). During the first part of the Middle Holocene, a drier climate resulted in shallow and fluctuating lake levels. Sites occur within remnant pluvial lake basins, along ancient dry stream channels, spring/seep locations, and in upland contexts in the Mojave Desert. Larger Pinto Complex sites contain midden (refuse) and a broader range of archaeological materials than smaller archaeological sites. The Pinto Complex artifact assemblage includes Pinto points, leaf-shaped points and knives, drills, heavy-keeled scrapers, retouched flakes, choppers, hammerstones, shell beads, less frequent artiodactyl remains (e.g., goats, deer, antelope), and small fauna.

Handstones and flat millstones appear in abundance for the first time in prehistory. Based on an abundance of milling tools, intensive plant exploitation was one of the inhabitants' subsistence strategies and access to plant resources must have been an important factor in determining site placement. Groups most likely consisted of multiple families living in centralized sites that were close to several locations used to gather resources (Sutton et al. 2007). In the Colorado Desert, archaeological sites dating to the Middle Holocene are rare. One site, the early component of Indian Hill Rockshelter in Anza-Borrego Desert State Park, has been dated to this period (Cleland et al. 2003; Schaefer and Laylander 2007).

The Deadman Lake Complex recently has been identified in the Twentynine Palms area only. "Five radiocarbon dates from three separate site components range between *ca.* 7500 and 5200 cal (calibrated) BC" (9500 to 7200 BP) (Sutton et al. 2007). The date range in Table 15.3 in Sutton et al. 2007 is between 7970±70 and 6410±80 radiocarbon years before present (RCYBP). The area where Deadman Lake Complex was identified may expand with future work. The assemblage has small- to medium-size contracting stemmed points, an abundance of battered cobbles and core tools, bifaces, simple flake tools, milling tools, and shell beads from the Pacific Ocean and the Sea of Cortez. The artifacts are similar to Pinto Complex artifacts, but with greater use of local igneous materials, simple flake tools, and core implements. It is possible the Deadman Lake Complex reflects a localized version of the Pinto Complex with a different subsistence strategy where the sites are located at higher elevations and have access to different resources than those of the Pinto Complex in remnant pluvial lake basins. Another possibility is that the Deadman Lake and Pinto complexes represent occupation of the same general region with different ecological niches by two different peoples (Sutton et al. 2007).

Late Holocene (After 4000 BP)

Following an approximately 1,000-year (*ca.* 5000 to 4000 BP) period of low site density in the Mojave Desert, the Gypsum Complex (*ca.* 400 to 2200 BP) emerged amid conditions somewhat wetter and cooler than the conditions of the Pinto Complex. The artifact assemblage of archaeological sites representing this period consists of corner-notched Elko, concave-base Humboldt, and shouldered contracting-stem Gypsum Cave points; leaf-shaped points with rounded or concave bases; large triangular knives with square bases; hammerstones; choppers; flake-based scrapers; scraper-planes; large drills with expanding bases; stone pendants; limited but regionally widespread shell beads; millstones; manos; mortars; and pestles. The presence of split-twig figurines and pit houses in the Northeastern Mojave Desert reflected influence from the Southwest (Warren 1984). Evidence of ritual activities at several sites includes quartz crystals, paint, and rock art. Sites are smaller but more numerous and in more diverse locations; however, there is a paucity of major Gypsum Complex sites in the southern and eastern portions of the Mojave Desert. Trade and social complexity increased during the Gypsum Complex interval (Sutton

et al. 2007). In the Northeastern Mojave Desert, sites are located in dunes near mesquite, flat gravel-covered benches, lake margins, ridgetops, and along the Amargosa River and surrounding mountains (Warren 1984). Few sites in the Colorado Desert have been dated to this period (Cleland et al. 2003).

In Owens Valley and the eastern Sierra, the late Holocene is represented by the Newberry Period (3500 to 1350 BP). Gypsum Cave and Elko series projectile points characterize the early part of the period along with an increase in population. Locations of occupation sites shift from riverine places to desert scrub zones (Garfinkel 1976). The latter part of this period is characterized by highly mobile groups by some of the members of the community with the majority settled at winter base camps with caches of Elko and Humboldt Basal notched points, bifaces, and milling equipment (Eerkens and Spurling 2008; Faull 2007). These mobile groups had gathering camps and separate, specialized hunting camps that focused on bighorn sheep, other artiodactyls (even-toed hoofed animals such as antelope), and smaller mammals (Arnold and Walsh 2010). Sites dating to the latter part of this period are typically base camps with structures and associated lithic (consisting of stone) reduction loci. Obsidian quarrying at Coso, Casa Diablo/Upper Eastern Sierra, and Bodie Hills reached its peak during this period (Eerkens and Spurling 2008; Gilreath and Hildebrandt 1997). Sites occur more in the Volcanic Tablelands and northern Owens Valley than in the southern Owens Valley area (Polson 2009).

During the first part of the Late Holocene (1750 to 850 BP) in the Mojave Desert, evidence of the Rose Spring Complex appeared and marked the beginning of bow-and-arrow technology. These sites have well-developed middens and a variety of material culture, including Eastgate and Rose Spring projectile points, stone knives, drills, pipes, bone awls, milling tools, marine shell artifacts, and large quantities of obsidian (Sutton et al. 2007). The sites are found near springs (Saratoga, Rose), along washes, and sometimes along lakeshores (Rogers/Rosamond and Koehn lakes). Evidence of wickiups or grass huts, pit houses, and other structures has been found in the western Mojave Desert (Sutton et al. 2007).

The Rose Spring Complex is termed the Haiwee Period (1350 to 650 BP) in Owens Valley (Arnold and Walsh 2010). Sites dating to this period show evidence of more sedentary groups with semi-subterranean houses. The bow and arrow (Rose Spring and Eastgate points) and storage pits are introduced, while artifact caching mostly disappears (Faull 2007). Production at obsidian quarries drops off (Eerkens and Spurling 2008). The band-like structure is replaced by the household as the primary socioeconomic unit (Polson 2009).

The cultural complexes in the Mojave and Colorado deserts have been grouped in the Late Prehistoric Period, which spanned from about 850 BP to the time of the historic era (Sutton

et al. 2007). There are three regional variants: (1) Hakatayan influence in the southern Mojave and Colorado deserts during the latter part of the period, (2) Ancestral Puebloan influence in eastern Mojave Desert during the early part of the period, and (3) Antelope Valley (Western Mojave Desert), distinguished by its trade ties with coastal people and apparently limited Hakatayan influence (Warren 1984). Most archaeologists view the Late Prehistoric Period as representing earlier forms of the region's modern ethnographic lifeways. A series of dry and wet episodes characterize the climate during this period (Sutton 1996, Weide and Barker 1974).

In the southern part of the Mojave Desert and the Colorado Desert, sites are centered near the shores of Lake Cahuilla at its high freshwater mark, and sites along the Colorado River show evidence of a lacustrine (found in or near lakes) adaptation. Sites vary from simple pot drops to seasonal camps and more permanent residential bases. Settlement appears to be more intensive along the northwest shoreline of Lake Cahuilla in the Coachella Valley, as represented by large-scale multiseasonal occupations and seasonal temporary camps. Sites along the eastern shoreline are less dense and smaller (Schaefer and Laylander 2007). As desert lakes dried during periods of low precipitation, people moved settlements away from the lakeshore to rivers, streams, and springs (Schaefer 1994). Artifacts in the southern Mojave Desert and the Colorado Desert include small projectile points (representing the use of bow-and-arrow technology), drills, flake scrapers, slate pendants, millstones, manos, metates (type of millstone), and shell beads. Burial practices also shifted from inhumations to cremations. Agriculture, paddle and anvil pottery (Brownware and Buffware from Arizona), and Desert Side-notched points were introduced in this period. These have been attributed to influences of the Patayan or Hakataya on the Colorado River.

Other cultural traits include rock art and an intricate long-distance trade network, as evidenced by numerous trail systems. Fish traps and house pits can also be found along the northwestern shoreline of Lake Cahuilla (Schaefer and Laylander 2007). During the latter part of the Late Prehistoric Period, Lake Cahuilla evaporated, forcing the area of occupation to shift to the Colorado River (Warren 1984). The majority of sites in the Colorado Desert date to this period (Laylander et al. 2010).

Similar to Lake Cahuilla, lakes in the Mojave Desert started to dry up and site locations were centered near ephemeral water sources during the latter part of the Late Prehistoric Period. Numic-speaking populations moved into the southern part of the western Mojave Desert at this time. Sites are centered in the Coso Volcanic Field, Coso Hot Springs, and near the Mojave River. There is evidence of Ancestral Puebloan materials near the turquoise mines near Halloran Springs, along the Mojave River and in the Cronese Lakes area (Sutton 1996).

In Owens Valley, the Late Prehistoric Period has been termed the Marana Period (650 BP to contact). The smaller household settlements continued. Cottonwood and Desert Side-notched points and Owens Valley Brownware (a coil and scrape type of construction) were introduced, and there was an increase in the use of ground stone tools as harvesting green pinyon nuts become the focus (Bettinger 1989; Eerkens and Spurling 2008).

Populations dependent upon agriculture as well as hunting and gathering occupied the Eastern Mojave Desert centered along the Colorado River. After 750 BP, the Chemehuevi moved into the eastern Mojave Desert. Artifact assemblages are similar to the Colorado Desert ones and consist of Desert series projectile points, buffware and brownware ceramics, shell and steatite beads, slate pendants, incised stones, and milling tools (Sutton et al. 2007).

Research Topics

Research topics commonly appearing in the California Desert Region archaeological literature include ceramic traditions, horticulture, trade and exchange, rock art traditions, and trails.

Ceramic Traditions

Schaefer and Laylander (2007) note that buffware pottery occurring within the Colorado Desert was initially assigned to the Hakataya ceramic series (Schroeder 1958, 1979). Subsequent studies (Waters 1982a, 1982b, 1982c) place it within the Lowland Patayan Ceramic Tradition. Both typologies are based on surface collections of sherds, with little data resulting from stratigraphic excavations or associated radiocarbon dates. Schroeder focuses upon details of temper, inclusions, and surface treatment, and Waters emphasizes rim form. Both attempt to define geographic limits of production for each type. Difficulties in applying either typology and problems with stratigraphic integrity, archaeological contexts, and anomalous associated radiocarbon dates, have allowed only gross chronological estimates and have limited identification of manufacturing regions.

In the Salton Basin, some sites dating between about 1600 to 750 BP contain pottery (Love and Dahdul 2002). This evidence suggests pottery was not introduced or rarely used prior to about 950 BP. Earlier dates from the preceding 200 years suggest Lake Cahuilla may have attracted Colorado River peoples (and their pottery). Early ceramic dates from the Colorado Desert correspond closely with the inception of widespread use of Tizon Brownware pottery in the Peninsular Ranges and along the Pacific Coast, although some dates suggest initial introduction of ceramics by 1200 BP, if not before (Griset 1986; Lyneis 1988).

Viewed regionally, pottery use within the Late Prehistoric Period of the Colorado Desert can be divided into three periods (Arnold et al. 2002; Love and Dahdul 2002; Waters 1982a, 1982b, 1982c). Patayan I times, about 1250 to 950 BP, witnessed the inception of several ceramic traditions. During Patayan II times, 950 to 500 BP, increased local manufacture and use of pottery occurred. Patayan III, 500 to 240 BP, saw the introduction of "Colorado Buff" pottery, and the westerly spread of ceramics to coastal Southern California.

With respect to social and cultural factors governing pottery adoption and use within the Colorado Desert, recent analyses of pottery from the Mojave Desert and surrounding areas provide models focused on behavioral implications regarding its manufacture and function. One concern has been with determining if ceramic vessels were locally made (Eerkens 2001; Eerkens et al. 1999, 2002[a]; Griset 1986). Neutron activation analysis and petrographic studies have been used to identify chemical and material signatures (Eerkens et al. 2002b). Pottery manufacture does not appear to have been organized at a higher regional level. Instead, pots generally appear to have been locally produced and used, with limited exchange of pots between different groups. Production appears to have been organized at an individual or family level, emphasizing production of largely utilitarian wares.

A relatively high number of elemental signatures suggesting higher levels of mobility characterize pottery from sites in the northern Mojave (Eerkens et al. 2002b). In addition to a higher degree of residential mobility, Eerkens (2003b) suggests people inhabiting the Northern Mojave Desert produced a fairly large number of pots. The combination of high mobility and a fairly high level of pottery production is seen as leading to caching pots near lowland wetlands, which were fixed in the landscape, development of pottery attributes promoting fuel consumption, and a high degree of standardization of largely utilitarian ceramics.

Sedentism in the Owens Valley appears to have developed concurrently with, or immediately prior to, an emphasis on resource storage, at approximately 1450 BP. Small seed intensification appears to have occurred about 700 to 600 BP, at the time brownware pottery became widely used.

Eerkens (2004) suggests that the significant increase in small seed use and the advent of brownware pottery around 700 to 600 BP are linked. People focused upon seeds because seed gathering areas could easily be privatized. That is, they could be individually owned and would not be subject to unrestricted sharing. Pots were a critical component of small seed intensification because they generally were individually made and owned and could be used within houses, allowing private food preparation and consumption. Privatization of small seed gathering areas may have resulted from increased population that yielded more potential "freeloaders," new community kinship structures, and the creation of resource surplus.

Horticulture

At the time of sustained Euro-American contact, 240 years ago, native peoples living along the Lower Colorado River and the Colorado Delta were growing a wide variety of cultigens and wild grasses that provided 30% to 50% of their subsistence economy (Bean and Lawton 1993; Castetter and Bell 1951; Schaefer and Laylander 2007). Annual flooding along the Colorado rejuvenated the soil and provided enough moisture to sustain crops. Lower Colorado River agriculture is presumed to have begun around 1250 BP. It probably spread either from the Hohokam area (to the east) or from Northern Mexico (to the southeast) (McGuire and Schiffer 1982).

Horticulture subsequently appears to have spread west from the Colorado River. Desert Tipai peoples practiced floodplain agriculture along the New and Alamo rivers. They also constructed small dams and ditches along washes to direct irrigation water onto adjacent terraces. Agricultural elements probably reached the Imperial Valley around 300 BP. Seed caches and mythological references to cultigens possibly indicate very late prehistoric adoption of agriculture. However, the caches contained both native and Old World cultigens. It is therefore unclear if agriculture penetrated west of the Peninsular Ranges in Southern California before Euro-American contact and the sustained influence that came with the establishment of Spanish missions.

Native cultigens may have reached the Western Colorado Desert through trade instead of by local production (Schaefer and Laylander 2007). Within the Colorado Desert, several archaeological sites have ceramic jars or rock-lined cache pits containing food remains of native or Old World plants (cf., Bayman et al. 1996; Swenson 1984; Wilke 1978; Wilke and McDonald 1989; Wilke et al. 1977). Pumpkin seeds occur in human coprolites (fossilized feces) from the Myoma Dunes at the north end of Lake Cahuilla, and in a ceramic jar from the west shore of Lake Cahuilla, north of the Fish Creek Mountains. The latter dated to 580 to 340 BP (Wilke 1978; Wilke et al. 1977). Early accounts of the first Mexican intrusion into the Coachella Valley in 1822-1823 noted walk-in wells dug by the Cahuilla that would have allowed for pot irrigation of crops (Schaefer and Laylander 2007).

Early to mid-nineteenth-century Cahuilla archaeological sites contain glass beads, flaked glass, domestic animal bones, carbonized maize and tepary beans, and uncarbonized gourds. Abundant evidence exists indicating the Cahuilla practiced irrigated agriculture during the early and mid-nineteenth century. The small quantity of macro- and micro-fossil cultigen remains from prehistoric archaeological deposits in Cahuilla territory strongly suggests agriculture did not play a significant role in the Cahuilla economy until the early nineteenth century. Early historic intensification of agriculture may have resulted from final desiccation of Lake Cahuilla, regional population growth, decreased mobility, and acculturation, including introduction of Euro-American irrigation techniques.

The Owens Valley Paiute were Great Basin Numic-speaking horticulturalists (Lawton 1976; Liljeblad and Fowler 1986; Steward 1930, 1933, 1938, 1941, 1970). Ditch and surface irrigation of blue dicks (*Brodiaea capitata*), yellow nut grass (*Cyperus esculentus*), and spikerush (*Eleocharis* sp.), was practiced. This most likely developed during late prehistoric times, possibly triggered by increased population pressure from climatic change and/or immigration (Bouey 1979).

In the Mojave Desert and environs, in the approximate period from 2000 to 800 BP, agriculture was first practiced in Southern Nevada and environs as a consequence of the Anasazi Intrusion (Warren 1984). Maize, squash, beans, grain amaranth, and sunflowers were grown. Agriculture was practiced along with foraging for wild plants and animals. Fields probably were irrigated in some manner, and agriculture appears to have intensified over time. Contrary to this, Wallace (1980) suggests Native American agriculture in the Mojave region was exclusively a historic-period phenomenon.

Yohe (1997) notes aboriginal cultigens, such as melons, squash, and beans, were present at two rockshelters dating to the late nineteenth or early twentieth century in Death Valley. Fowler (1995; 1996) details garden horticulture among the Southern Paiute and Panamint and Timbisha Shoshone. Stream-irrigated gardens were cultivated to grow corn, beans, squash, sunflowers, and amaranth. These groups also planted gardens near springs, had communal fields with irrigation ditches, and un-irrigated stream-bank garden plots. Various land management practices were employed, including intentional burning, clearing, pruning and coppicing (cutting trees to the ground to encourage growth), transplanting and cultivation, and cleaning water sources.

Winter and Hogan (1986) note that during protohistoric times, agriculture was practiced by the Southern California/Nevada Chemehuevi and Ash Meadows, Pahrump, Las Vegas, and Moapa Southern Paiute bands. Among the crops grown were corn, beans, squash, and sunflowers. Forms of plant husbandry directed toward nondomesticates included burning to encourage growth of new plants, broadcast seed sowing, and irrigation of wild stands of bulb and seed plants (Winter and Hogan 1986). These practices are thought to have begun prehistorically, continuing and possibly expanding during early historic times.

Trade and Exchange

As Schaefer and Laylander (2007) note, prehistoric and ethnohistoric Colorado Desert peoples had a highly developed network of connections linking locations within and beyond the region. High mobility produced considerable cross-cultural interaction and integration in spite of frequent open aggression and warfare between different groups. This integration and interaction occurred between mobile hunter-gatherers and sedentary horticultural peoples. They are archaeologically manifested by the spatial distribution of site types, rock art, artifacts (especially ceramics and shell ornaments), and toolstones (especially obsidian).

Archaeologists trace the dynamics of prehistoric trade in the Colorado Desert by analyzing the distributions of artifacts made from various toolstones, shell beads and ornaments, and ceramic types and composition (Schaefer and Laylander 2007). As previously stated, with respect to toolstones, obsidian from Obsidian Butte is fairly commonly represented in sites located within montane and coastal Southern California (Hughes 1986; Hughes and True 1982; Laylander and Christenson 1988). Obsidian from sources in Northern Baja California may have been routed via the Colorado Desert to coastal Southern California sites (McFarland 2000). Wonderstone (a glass striped rhyolite) from the Rainbow Rock source is present in Western San Diego County and the northern Coachella Valley (Bean et al. 1995; Pigniolo 1995). Material for steatite (soapstone) artifacts found in Colorado Desert sites probably comes from sources in the Peninsular Ranges and Southern Channel Islands. Material for argillite (clay) artifacts may be from a central Arizona source.

Artifacts made from shellfish species inhabiting the northern Sea of Cortez occur in coastal Southern California and the Great Basin (Bennyhoff and Hughes 1987; Fitzgerald et al. 2005) and may have been traded through the Colorado Desert (Schaefer and Laylander 2007). Shells from Southern California coastal species have been found at a number of Colorado Desert sites and in the Southwest (Ford 1983). These artifacts may have resulted from direct procurement of shells or exchange. At the Elmore site, associated with the protohistoric recession of Lake Cahuilla, shell debitage (waste materials produced from chipping a hard substance such as shell or stone) indicates local manufacture of shell beads and ornaments (Rosen 1995). In the Coachella Valley, shell artifacts may reflect close ties to peoples living along the Santa Barbara Channel.

A cache of Lower Colorado Buffware (i.e., Patayan) anthropomorphic figurines found in an Orange County site indicates interregional connections (Koerper and Hedges 1996). These also are suggested by the frequency of Lower Colorado Buffware (i.e., Patayan/Hakataya) pottery throughout the Colorado Desert (Bean et al. 1995; Cordell 1997; McGuire 1982; Schaefer and Laylander 2007; Schroeder 1979; Shaul and Hill 1998; Waters 1982a, 1982b, 1982c). However, its use occurred among a number of prehistoric peoples practicing divergent settlement and subsistence patterns. Consequently, little effort has been made to refine or apply the Patayan tradition as an integrative model.

Davis (1961) and Sample (1950) note that a considerable degree of historic-period trade between Native Americans occurred within and across both the Mojave and Colorado deserts. Trade networks across the deserts extended to the Yokuts, Chumash, and Gabrielino. Native peoples living along the Colorado River received and reciprocated goods from many groups living to the east and west.

Trails

During prehistoric and ethnohistoric times, an extensive network of Native American trails was present in the Colorado Desert and environs (Apple 2005; Cleland 2007; Earle 2005; Davis 1961; Fowler 2009; Heizer 1978; McCarthy 1993; Melmed and Apple 2009; Sample 1950; Von Werlhof 1986). Segments of many trails are still visible, connecting various important natural and cultural elements of landscape; for example, these trails are often marked by votive stone piles (cairns) and ceramic sherd scatters (pot drops). These trails were used both for exchange and ceremonial purposes (Fowler 2009). Overviews of trail systems that enter the region can be found in works by Davis (1961) and Fowler (2009).

Examples of these trails include a late prehistoric-early historic Native American trail traversing roughly east/west through the Chuckwalla Valley (Johnson and Johnstone 1957). Johnson (1980) identifies this route as part of the Halchidhoma Trail (recorded as CA-Riv-53T) running from San Bernardino through San Gorgonio Pass to the Colorado River at present day Palo Verde Valley. The Mojave Trail was a route that connected the Pacific Coast with the interior deserts. This traveled from near Fort Mohave to Soda Lake, and then followed the Mojave River, passing through Cajon Pass into the Los Angeles Basin (Fowler 2009).

The Salt Song Trail is a Southern Paiute sacred trail corridor that makes a circuit between the Mojave Desert and the southern portion of the Wasatch Range, passing through Utah, Nevada, California, and Arizona. At times it closely follows the Colorado River. The trail is believed to be traveled by the deceased, with the aid of traditional practitioners who, through song, story, and prayer, usher the deceased along the path on their post-burial journey to the afterlife. The trail consists of physical marks on the land, both trail marks and natural land patterns, wayside locations where specific songs and other ceremonies are sung or conducted, and a corridor along the trail system (Musser-Lopez and Miller 2010).

Rock Art Traditions

Rock art is a fundamental component of the landscape throughout the California Desert Region and consists of "designs, motifs, or patterns that are permanently placed on a feature on the natural landscape" (Whitley 2000). It is important to note that using the word "art" can imply that the designs were created for reasons analogous to that of western art (Whitley 1998). However, production of rock art occurred for a variety of reasons, many of which may never be known. Rock art can be seen as a type of communication between the creator and the viewer that is embedded in the landscape. This communication can involve a variety of messages over time, including signifying territorial claims, messages between the spiritual world and the corporeal world or between living beings and the dead, spiritual lessons between elders and students, or

signs about the natural or spiritual world surrounding the rock art location. Portions of rock art meaning are no longer available because the creators of the rock art are no longer present to provide intent, meaning they must be deciphered. Interpretation usually relies on the depiction informed by the relationships between various depictions and relationships of various rock art locales to other known natural and cultural locales, as well as to ethnographic, ethnohistoric, and current oral history evidence and analogy (Braun and Gates 2013).

In California, rock art is generally classified based upon the designs and motifs of the art, the medium (i.e., rock art that is painted—pictographs, etched/chiseled/pecked—petroglyphs, or scraping large areas of desert pavement to reveal a lighter subsoil—earth figures/intaglios/geoglyphs), and ethnographic and ethnohistoric evidence (Braun and Gates 2013). Within the California Desert Region, the majority of rock art belongs to Great Basin Tradition, although the Earth Figure Tradition is found along the Colorado River and in portions of the Colorado Desert, and the California Tradition is found in the Peninsular Ranges (Braun and Gates 2013; Whitley 1998).

Californian Tradition rock art generally consists of monochrome pictographs displayed on a small number of panels within small rock shelters and depicting up to a dozen motifs. Common colors include red, black, and white, with yellow, orange, and blue appearing less frequently. The most common motifs are simple geometric patterns, including circles and discs, "ladders," diamonds, and zigzags. The last two are often identified as representing rattlesnakes. When figural motifs appear, they are usually simple depictions of humanoids, handprints, and lizard-like figures (Whitley 1998).

Earth figures are typically found in clusters of one or a few images, and are usually found in association with archaeological features (see "Trails," above). The most common motifs are thin anthropomorphic or human figures, but other motifs such as animals, concentric circles, crosses, arrows, quarter-moons, a maze-like grid, six-pointed stars, and interlocking ovals are also found. The earth figures are important sites for the Yuman speakers along the Lower Colorado River and are critical to understanding the relationship of these groups to the Xam Kwatcan/Dream Trail (Braun and Gates 2013).

The Great Basin Tradition is the primary rock art tradition of the California Desert Region found principally east of the Peninsular Ranges in the desert regions and portions of the Sierra Nevada (Whitley 2000). It differs from the California Tradition in that it is primarily engraved rather than painted, it is concentrated in specific locales, and it consists of different motifs (Whitley 2000). Two variants are identified, the Great Basin Painted and the Great Basin Engraved. The latter variant is dominated by pecked and abraded motifs, fine-line incising or scratching, a variety of geometric designs, including curvilinear meanders, dot patterns, grids, zigzags, concentric circles, spirals, and circular

designs. The scarce representational images from the Colorado Desert are predominately snakes and simple humanoid figures with exaggerated fingers and toes (Braun and Gates 2013; Whitley 2000).

III.8.2.3 Ethnographic Context

The following section provides an ethnographic context for the Native American groups in the LUPA Decision Area, referred to here as the California Desert Region. The discussion is organized by language family and describes the role of linguistic evidence in understanding the prehistoric and historic development of tribal territories. This section identifies the cultural characteristics that distinguish tribes from one another. It also discusses the influence of European colonialism and later intrusions by miners and ranchers onto tribal lands on Native American groups in the California Desert Region. The current population, location, and federal status of each tribe is also provided.

Chapter III.9, Table III.9-1, Tribes with Traditional Ties to the LUPA Decision Area, lists federally recognized and non-federally recognized tribes in both areas, current tribal enrollment, and their cultural affiliation. Chapter III.9, Section III.9.2, Tribes with Interests in the LUPA Decision Area, describes what it means to be a "federally recognized" Indian Tribe and the relationship of the United States Government to federally recognized tribes. It is important to keep in mind that many of the cultural practices associated with various tribes, such as plant gathering, are still practiced today.

Two major linguistic divisions exist within the California Desert Region: the Hokan and the Uto-Aztecan stocks (Figure III.8-1). Within the region, the Hokan stock includes the Yuman language family and the Uto-Aztecan stock includes the Numic and Takic language families. For the purposes of this discussion, within the California Desert Region these language stocks associate reasonably well with the two primary geomorphic areas: the Mojave Desert/Western Great Basin and the Colorado Desert/Colorado River. Uto-Aztecan languages—Numic and Takic speakers—are found in the Mojave Desert, and Hokan languages—Yuman speakers—in the Colorado Desert (Golla 2007, 2011; Kendall 1983; Miller 1986; Shipley 1978).

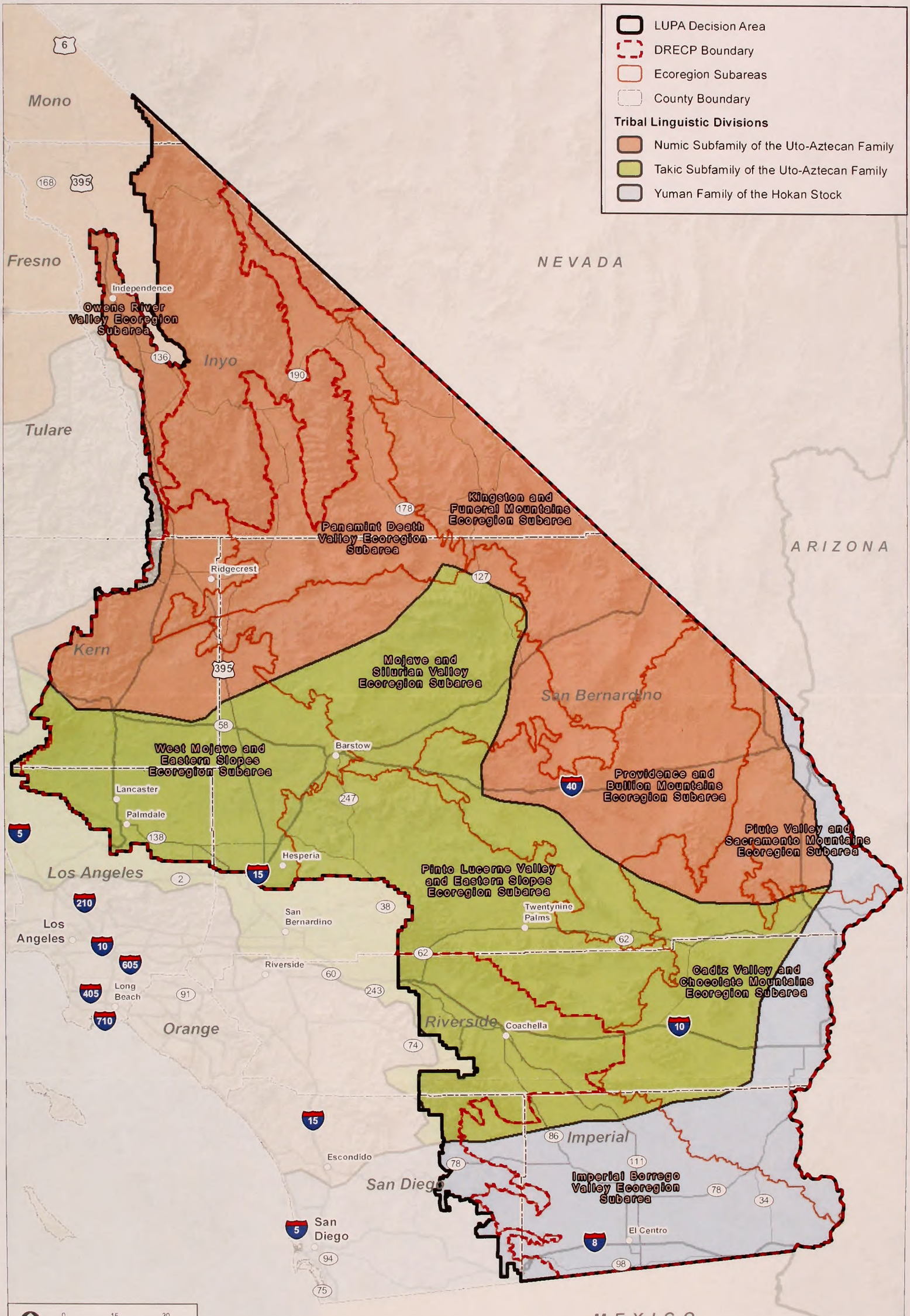
The five Native American groups that speak Yuman languages are the Kumeyaay, Cocopah, Quechan, Halchidhoma, and Mojave (sometimes spelled Mohave). Speakers of languages derived from the Numic branch of the Uto-Aztecan language group include the Kawaiisu, Southern Paiute (Pahrump, Moapa, and Chemehuevi), Western Shoshone (including Panamint or Koso), and Owens Valley Paiute; the speakers of the languages derived from the Takic branch include the Kitanemuk, Serrano, and Cahuilla (Kelly and Fowler 1986; Luomala 1978; Thomas et al. 1986; Warren 1984).

Evidence for population movements and the location of these groups at contact have been evaluated based on diagnostic artifacts, projectile points, milling technology and ceramics, burial patterns, and specialty items such as crescentics and beads. It should be noted that the ethnographically recorded groups associated with the Proposed LUPA and the boundaries between groups were not like those of modern nation states and were instead indistinct, changeable, and permeable. Contact between groups, such as trade, marriage, and conflict all affected boundaries, as did changes in environmental conditions.

Yuman Language Family (Colorado Desert)

The general linguistic explanation for the distribution of modern California Indian languages is that the Hokan stock has the greatest antiquity and was, at one time, distributed throughout California (Taylor 1961). In the far Southwest, the Hokan stock is represented by the Yuman family. The Yuman family extends from the Colorado River Valley across the southern portion of California and Northern Mexico to the Pacific Ocean (Golla 2007, 2011; Kendall 1983).

The languages that make up the Yuman family exhibit great similarity, as demonstrated by examination of comparative vocabularies (Wares 1968). The division and expansion of the proto-Yuman language may have begun *ca.* 2000 BP (Laylander 1985). Laylander believes the expansion originated from Northern Baja California. Howard Law (1961), on the other hand, believes that the Proto-Yuman speakers are native to a desert area similar to their present location, which is primarily in the lower Colorado River Valley. This would seem to indicate that the Yuman languages may have expanded from the lower Colorado River Valley or Baja California about 2,000 years ago (Golla 2011).



Sources: ESRI (2014); BLM (2015); California Handbook of North American Indians, vol. 8 (1978); Southwest Handbook of North American Indians, vol. 10 (1983); Great Basin Handbook of North American Indians, vol. 11 (1986)

FIGURE III.8-1

Tribal Linguistic Divisions in the LUPA Decision Area and the DRECP Plan Area

DRECP Proposed LUPA and Final EIS

October 2015

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Confirmation, or refutation, of the long-term development and ultimate expansion of the Yuman languages from the Colorado River or Baja California is critical to the explanation of the cultural development of Southern California. If the Yuman languages expanded roughly 2,000 years ago, they either filled a void or replaced an existing speech community.

As noted earlier, the five tribes that speak Yuman languages are the Kumeyaay, Cocopah, Quechan, Halchidhoma, and Mojave. To understand what archaeological materials these tribes may have left behind, it is important to understand where their traditional territories are located. A description of lands traditionally occupied by each tribe (Figure III.8-2) follows. The territory locations suggested by this figure are approximate and cannot represent all of the nuances of multiple tribes, present day ancestral claims.

Kumeyaay

At the time of the Spanish exploration of the area, the Kumeyaay (also referred to as the Tipai, or Kumiai in Baja California) occupied the southern two-thirds of San Diego County from Agua Hedionda on the north to Todos Santos Bay, Mexico, on the south, the Imperial Sand Dunes on the east, and the Pacific Ocean on the west (Luomala 1978).

Beginning with the Spanish invasion in 1769, continuing through the Mexican Period of 1826 to 1848 and on through the American Period, the Kumeyaay were forced off their ancestral lands. Nearly all of the Kumeyaay lands were taken into private ownership or made U.S. government holdings (Viejas Band of Kumeyaay Indians 2014). In 1875, President Ulysses S. Grant issued an Executive Order to set aside Indian land, allowing for the (later) establishment of reservations for the Santa Ysabel, Pala, Sycuan, La Jolla, Rincon, Viejas, and Capitan Grande bands. In 1891 the La Jolla and Cuyapaipe Reservations were established and in 1893, the Pauma, Yuima, and Rincon Reservations were established. In 1932 the Barona Band of Kumeyaay were forced off ancestral land on the San Diego River to make way for the El Capitan Dam and reservoir, and they were relocated to the present-day Barona reservation (Kumeyaay.com 2014).

Today, Kumeyaay tribal members are divided into 12 separate tribal organizations – Barona, Campo, Ewiiaapaayp, Inaja-Cosmit, Jamul, LaPosta, Manzanita, Mesa Grande, San Pasqual, Santa Ysabel, Sycuan, and Viejas. Kumeyaay governments have jurisdiction over approximately 70,000 acres in mostly Eastern San Diego County, from El Cajon, Lakeside, Poway, and Ramona, to the desert (Viejas Band of Kumeyaay Indians 2014).

The Ewiiaapaayp Tribe is a federally recognized Indian Tribe listed in the Federal Register as "The Cuyapaipe Community of Diegueño Mission Indians of the Cuyapaipe Reservation, California." Their reservation was established in 1893 and increased in

size to 4,542 acres by 2000. The Ewiiaapaayp tribal office is located in Alpine, California (Gates and Crawford 2010).

Campo Kumeyaay Nation was established in 1893 on the Campo Indian Reservation, and has 351 enrolled members. The tribe operates Muht Hei, Inc., an economic development branch with a casino, construction materials facility, and a wind energy facility. The Tribal government consists of a 7-member Executive Committee elected by the General Council of the tribe (Campo Kumeyaay Nation 2009).

The Manzanita Band of Kumeyaay Nation Reservation, with a population of 69 people, encompasses 3,580 acres in the Carrizo Desert located approximately 20 miles west of the northwestern shore of the Salton Sea (SCTCA n.d.).

La Posta Tribe of Kumeyaay Indians is a small tribal group with lands adjacent to the Manzanita and Campo Tribes located in the Jacumba Mountains near the Mexico–California border. It operates a casino and has tribal headquarters on the reservation near the town of Boulevard, California (Gates and Crawford 2010).

The Iipay Nation of Santa Ysabel, formerly the Santa Ysabel Band of Diegueño Indians, occupies the Santa Ysabel Indian Reservation near Lake Henshaw, California. This reservation is over 15,000 acres, spread between three tracts of land. The tribal government is divided into four branches: General Council, Legislative, Executive, and Judicial. The General Council consists of over 700 adult voting members, the Executive Branch is comprised of a Chairman and Vice Chairman, the Legislative Branch consists of seven Legislators, and the Judicial is composed of tribal judges (Iipay Nation of Santa Ysabel 2014).

The Mesa Grande Band of Mission Indians is a federally recognized Tribe of Kumeyaay closely related to the Iipay Nation of Santa Ysabel. Their 920-acre reservation in Black Canyon is located near Santa Ysabel (SCTCA n.d.).

The Sycuan Band of the Kumeyaay Nation is a federally recognized tribe with a 640-acre reservation in El Cajon, California. The tribal government is made up of a 7-member council. The Sycuan operate the Sycuan Casino (Sycuan Tribe 2012).

The San Pasqual Band of Mission Indians is a Kumeyaay federally recognized tribe, with a reservation near Lake Wohlford. The tribe is led by a Tribal Council comprised of five tribal members. The 1438-acre reservation is home to the Valley View Casino (San Pasqual Band of Mission Indians n.d.).



Sources: ESRI (2014); BLM (2015); California Handbook of North American Indians, vol. 8 (1978); Southwest Handbook of North American Indians, vol. 10 (1983); Great Basin Handbook of North American Indians, vol. 11 (1986)

FIGURE III.8-2

Tribal Territories in the LUPA Decision Area and the DRECP Plan Area

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The Jamul Indian Village is a federally recognized Tribe of Kumeyaay. Its reservation is a mere 6 acres in size, located 10 miles south of El Cajon. Their tribal government is a 6-person tribal council (Jamul Indian Village 2014).

The Inaja-Cosmit Band of Indians is a federally recognized Tribe of Kumeyaay with an 852-acre reservation near Julian, California (SCTCA n.d.)

The Barona Band of Mission Indians is a federally recognized Tribe of Kumeyaay. Its reservation is in the mountain foothills of San Diego County, near Lakeside, California. It has a total area of 5,903 acres. Tribal membership is about 490 (Barona Band of Mission Indians Tribal Office n.d.; White 2011). Together with the Viejas Band of Kumeyaay Indians, the Barona share a joint-trust patent for the 15,000 acres of the Capitan Grande Reservation that were not flooded in 1931 to create El Capitan Reservoir (Viejas Band of Kumeyaay Indians n.d.).

The Viejas Band of Kumeyaay Indians, is a federally recognized Tribe of Kumeyaay residing on a 1,600-acre reservation in the Viejas Valley, east of the community of Alpine in San Diego County, California. Like the Barona Band, their ancestors were forced to leave the Capitan Grande Reservation when the central portion of it was flooded to create the El Capitan Reservoir in 1931. Together with the Barona Band, the Viejas Band share a joint-trust patent for the 15,000 acres of the Capitan Grande Reservation (Viejas Band of Kumeyaay Indians n.d.). The Viejas tribal membership is approximately 290 (White 2011). The Viejas Band government is formed of the general council of all eligible voting tribal members and a 7-member tribal council. The tribe operates a variety of economic ventures, including the Viejas Casino (Viejas Band of Kumeyaay Indians n.d.).

Cocopah

The Cocopah lived on the west side of the lower Colorado River delta from the tidewater area, north from a little above the latitude of Volcano Lake or Cerro Prieta to several miles south of the U.S.–Mexico border (Castetter and Bell 1951). Today there are two branches of Cocopah, one in the United States ("American Cocopah") and one in Mexico ("Mexican Cocopah"). This division resulted from the actions of the United States and Mexico governments concerning Indians residing within the boundaries of these two dominant nations. For instance, in 1917 the United States gave the "American Cocopah" title to three small land areas under the jurisdiction of the Yuma agency (Williams 1983). Increased border enforcement in 1930 exacerbated the separation of the two groups (Kelly 1977).

The Cocopah in Arizona began to organize in 1961, beginning with a revision of the tribal constitution and bringing electricity to tribal lands. The Cocopah have four reservations: Cocopah West Reservation, Cocopah East Reservation, Cocopah North Reservation, and

Cocopah Lots 5 and 6 (Williams 1983). In 1964 the Cocopah Indian Tribe formed its first constitution and a 5-person tribal council. Originally the reservations totaled 1,800 acres, but in 1985 the Cocopah obtained an additional 4,200 acres of reservation land, including the North Reservation, via the Cocopah Land Acquisition Bill. A chairperson, vice chairperson, and three council members currently lead the tribe (Cocopah Indian Tribe 2014). The tribe also employs a cultural resources director to facilitate cultural resource issues for them.

Quechan

Quechan territory was centered at the confluence of the Gila and Colorado rivers (present-day Yuma, Arizona), but extended north on the Colorado about 15 miles above the confluence and 30 miles up the Gila (Kroeber 1925). In 1605 Spanish explorer Juan de Oñate first noted the Halchidhoma, who were northern Quechan, below the confluence of the Gila and Colorado rivers. There were eight pueblos, with the northernmost containing 160 houses and 2,000 people. In 1702, Jesuit Padre Eusubio Kino saw them north of this confluence. They had moved up the Colorado River to escape Mojave and Quechan enemies. By 1776, when Francisco Garcés traveled through the area, the Halchidhoma had moved farther north along the Colorado River near Parker, Arizona, due to continued raids from the Mojave and Quechan (Yumans). Eventually the Halchidhoma settled along the confluence of the Gila and Salt rivers among the Maricopa in Arizona after the Mojave and Quechan drove them east (Kroeber 1925).

The Quechan Tribe is a federally recognized tribe with its governmental office in Yuma, Arizona (BIA 2012). The U.S. government established the Fort Yuma–Quechan Reservation on the California side of the Colorado River in 1884, although Euro-American settlers appropriated much of the land. Reservation lands were further broken up by allotment to individual Quechan members in 1912. The tribe ratified a constitution and elected a 7-person tribal council in 1936. In 1978 the tribe had 25,000 acres of land restored to them (Bee 1983). Today, the Quechan Tribe's reservation spans the Arizona-California border at the Colorado River near the confluence with the Gila River and encompasses 45,000 acres of land.

A president, vice president, and five council members head the tribal government. Business enterprises include a 700-acre agricultural lease to a nontribal farmer and a sand-and-gravel lease to a private company. The tribe also manages trailer and RV parks, a museum, a casino, a utility company, and a fish and game department (Inter-Tribal Council of Arizona 2011). The tribe employs a cultural resources director and maintains the Quechan Cultural Committee.

Mojave

The Mojave controlled the area north of the Bill Williams River up to the present Nevada border, but their main settlements were in the Mojave Valley from about Davis Dam, Arizona, at the north to the vicinity of Topock in the south (Castetter and Bell 1951; Kroeber 1925; Stewart 1983). They also lived south in the Colorado River Valley in 1604 when Juan de Oñate's Spanish expedition passed through the area (Stewart 1983). They also inhabited the Chemehuevi Valley periodically after the Halchidhoma were forced to move east (Kroeber 1925). Violent confrontations occurred between the Mojave and beaver trappers in the 1820s over disputes regarding payment for beaver taken from the river. The U.S. annexation of Arizona and increasing military presence in the 1850s led to the establishment of a military outpost in 1859 on the east bank of the Colorado River to give safe passage to American immigrants traveling from east to west. The military fort was originally called Camp Colorado but was later renamed to Fort Mojave. When the fort closed in 1891, the buildings were turned into a boarding school, which operated until 1930 (Fort Mojave Indian Tribe 2014; NPS 2014b).

Currently, the Mojave Indians are members of one of two tribes: (1) former residents of the Fort Mojave Reservation in Arizona, now residing in Needles, California, and (2) Mohave of the Colorado River Reservation, part of the Colorado River Indian tribes (Stewart 1983).

The Fort Mojave Indian Tribe of Arizona, California, and Nevada is a federally recognized tribe with its governmental seat in Needles, California (BIA 2012). The Fort Mojave Reservation covers almost 42,000 acres in Arizona, California, and Nevada. The land is divided into three major segments: 23,669 acres in Mojave County, Arizona; 12,633 acres in San Bernardino County, California; and 5,582 acres in Clark County, Nevada (Fort Mojave Indian Tribe 2014). The Fort Mojave tribal government consists of a chairperson, vice-chairperson, secretary, and four council members. The tribe operates the Avi Resort and Casino, which contains a casino, hotel, restaurants, and a movie theater. The tribe also hosts an annual Pow Wow every February (Fort Mojave Indian Tribe 2014). The tribe's cultural affairs are directed by the Aha Makav Cultural Society.

Colorado River Indian Tribes

The Colorado River Indian Tribes include people from four distinct groups within the membership: Mohave, Chemehuevi, Hopi, and Navajo. Their approximately 300,000-acre reservation includes portions of San Bernardino and Riverside counties in California and La Paz County in Arizona. The tribal government is composed of a 9-member council that includes a tribal chairman, secretary, and treasurer. Active tribal membership is about 4,070 as of 2009. The largest element of the tribal economy is agriculture, but economic

development includes sand and gravel quarrying, real estate development, and tourism, with the Blue Water Resort and Casino in Parker, Arizona (Colorado River Indian Tribes 2009).

Cultural Characteristics for the Yuman Language Speakers

Cultural characteristics for Yuman language speakers in the Colorado Desert include cremation of their dead, hunting and gathering, river agriculture, and diagnostic artifact classes. Three diagnostic artifact classes have been commonly used to define the appearance of the ethnographic Yuman groups. These include Cottonwood and Desert Side–notched points, use of mortars, and the appearance of Tizon Brown and Colorado River Buff wares. Although point types have not been identified in the ethnographic literature, there are numerous references to bow hunting. Both Desert Side-notched and Cottonwood points, used for bows, have been typically associated with ethnographic occupations of the area. These point types have an established date range of 650 BP to 50 BP in the Colorado Desert (Justice 2002).

Acorns were also gathered and traded from groups to the west. For the Kumeyaay, the use of mortars has been ethnographically associated with the processing of acorns. Mortars were usually in bedrock outcrops and were sometimes portable (Luomala 1978). In the Colorado Desert, mortars were made of cottonwood and used to process acorns, mesquite pods, screwbeans, and various seeds (Castetter and Bell 1951; Gifford 1931). These types of portable mortars have not survived, though stone mortars have. Dating the appearance of mortars could help mark the appearance of Yuman speakers in the area.

Numic/Takic Language Subfamilies (Mojave Desert/Western Great Basin)

Golla (2007, 2011) proposes the development of the Takic languages in California as dating prior to 2,000 years ago, and that the Numic languages developed somewhat more recently between 1,500 and 2,000 years ago. The time for the split between the Numic dialects is estimated to have begun between 1,000 and 800 years ago (Golla 2011).

In most explanations, the expansion of the Uto-Aztecan languages within the Mojave Desert and Western Great Basin show similar time depths to those of the Yuman languages in the Colorado Desert (see "Yuman Language Family [Colorado Desert]," above). As with the Yuman languages, expansion toward the coast either filled a void or replaced an existing speech community. Early explanations described the "Uto-Aztecan wedge," based principally on the assumption of a broad Hokan dispersed language group where the Chumash and Yuman speakers were split by the Uto-Aztecan speakers who moved from the Mojave Desert, the southern Sierra Nevada, and Southern San Joaquin Valley to the coast in what is present-day Los Angeles and Orange counties (Sutton 2009).

As noted earlier, the four groups that speak languages from the Numic branch are the Kawaiisu, Southern Paiute (Moapa, Las Vegas, Pahrump, and Chemehuevi), Western Shoshone (specifically the Panamint or Koso), and Owens Valley Paiute. The three groups who speak languages from the Takic branch include the Kitanemuk, Serrano, and Cahuilla. As stated earlier, to understand what archaeological materials may have been left behind by these groups, it is important to know where their traditional territories are located. The following is a description of lands traditionally occupied by each group.

The Kawaiisu, or "Nuwa," occupied the southern end of the Sierra Nevada watershed by the Piute and Tehachapi mountains at the line between the Great Basin and California cultures. The habitat was in the mountainous ridge between the Mojave Desert and the San Joaquin Valley. One source suggests that there were Mountain Kawaiisu who lived in the Piute and Tehachapi mountains and Desert Kawaiisu who lived east of Tehachapi into southern Death and Panamint valleys where they sometimes lived with Shoshone (Garfinkel and Williams 2009).

Relocation by the United States Government in the late 1800s resulted in the loss of much of the Kawaiisu traditional dress, music, language, and knowledge of traditional practices. In the early 2000s, there were only five native speakers remaining and few tribal members who had retained knowledge of the tribe's traditions. In response to this, in 2002 tribal members came together to form the Kawaiisu Language and Cultural Center. In 2007, the Center became a nonprofit organization and formed an 11-member board of directors. The Center provides for Kawaiisu tribal members and members of other tribes with tools for teaching traditional language and culture (Kawaiisu Language and Cultural Center 2014; Lawrence 2009). Currently, the Kawaiisu number around 250 and are a non-federally recognized Indian Tribe (Kawaiisu Language and Cultural Center 2014). An additional Kawaiisu organization is the Kawaiisu Tribe of the Tejon Indian Reservation. This is also not a federally recognized tribe. Members are represented by a 5-member tribal council (Kawaiisu Tribe of the Tejon Indian Reservation 2014).

The Southern Paiute represent a population of people who were the traditional inhabitants of a territory ranging from the northeastern Mojave Desert through Southern Nevada into Southwestern Utah and Northwestern Arizona to the north of the Colorado River. The Pahrump and Las Vegas bands are the two most southwestern groups of Southern Paiute, except for the Chemehuevi.

The Pahrump Paiute Tribe, located in Pahrump, Nevada, is not a federally recognized tribe, but is recognized as an established tribal entity by the State of California and is often consulted by federal land managing agencies that operate within their traditional territory. The tribe currently consists of approximately 100 tribal members. The tribe is led by a chairperson and is based in Pahrump, Nevada. While the Pahrump Paiute Tribe has no

reservation, they do assert an ancestral territory that includes the southeastern portion of Inyo County and the northeastern corner of San Bernardino County, as well as the adjacent portion of Nevada. The primary focuses of the tribe are to maintain their unique cultural identity, to protect important cultural resources that are in harm's way of various projects, and to attain federal recognition (Gates 2012).

The Las Vegas Tribe of Paiute Indians of the Las Vegas Indian Colony is a federally recognized tribe. It consists of approximately 71 enrolled members with a 3,800-acre reservation generally referred to as "Snow Mountain," located several miles north of Las Vegas. The Pahrump Paiute and the Las Vegas Paiute are closely related to one another and to some of the Moapa Tribe Isabel Kelly identified both Pahrump and Las Vegas under the Las Vegas Paiute Tribe; however, each tribe has continuously maintained its distinct identities and function independently. The tribe's original reservation was a 10-acre plot of land located in downtown Las Vegas and deeded to the tribe in 1911 by a private ranch owner. The 10-acre plot is still part of the reservation. The tribe has a constitution adopted in 1970, and is governed by a tribal council. The tribe has several businesses, including an extensive golf resort, gas station, and two smoke shops. Recent issues that involve the tribe concern on-going desecration of tribal cultural sites, including graffiti of sacred sites in the Red Rock area, a popular tourist destination for visitors to Las Vegas. Cultural resources issues are dealt with by the Tribal Environmental Protection Office (Gates 2012).

The Chemehuevi are considered a subgroup of the larger Southern Paiute group. They are differentiated from the rest of the Southern Paiute by their cultural ties with the Mojave and Quechan, from whom they also took many loanwords. The Chemehuevi occupied territory west of and along the Colorado River, south of Needles into eastern Mojave Desert as far east as Providence Mountains (Kelly and Fowler 1986; Kroeber 1925). In 1776, no Chemehuevi were along the Colorado River; however, they moved into the Chemehuevi Valley after the Halchidhoma were forced to move east with the Maricopa. After 1867, they moved back to the remote desert when war broke out with the Mojave (Kroeber 1925). The modern descendants of the Chemehuevi belong to a number of different federally recognized tribes, including the Colorado River Indian tribes (see "Yuman Language Family [Colorado Desert]" above), the Chemehuevi Tribe of the Chemehuevi Reservation, and the Twenty-Nine Palms Band of Mission Indians.

The Chemehuevi Tribe is a federally recognized tribe and the official name is the Chemehuevi Indian Tribe of the Chemehuevi Indian Reservation (BIA 2012). Rather than remain on the Fort Mojave Reservation near Needles, California, where they had been forced to live with some of the Mojave, the Chemehuevi requested that the federal government establish their home in their traditional area, the Chemehuevi Valley. They remained there and at Beaver Lake and Cottonwood Island until dam construction forced

them out in 1929. The Chemehuevi Reservation was founded on the Colorado River in Chemehuevi Valley north of Parker, Arizona (Kelly and Fowler 1986).

In 1935, Congress authorized the Metropolitan Water District to obtain as much reservation land as needed to create Parker Dam, which ultimately caused the inundation of 8,000 acres of tribal lands in 1940. In the 1960s, some Chemehuevi members from the Colorado River Indian Reservation joined with off-reservation tribal members in reorganizing the Chemehuevi Tribe and reactivating the Chemehuevi Reservation. The Chemehuevi Indian Tribe's constitution was established February 14, 1970 (Rusco and Rusco 1978).

The current reservation encompasses 32,000 acres of trust land with 30 miles of Colorado River frontage (Chemehuevi Indian Tribe 2014). The tribe is based in Havasu Lake, California (BIA 2012). An executive committee comprising a chairperson, vice chairpersons, and secretary treasurer oversees daily tribal operations and enterprises. The tribe also has a 9-person tribal council and a tribal court (active since 1996). The tribe's Cultural Center seeks to educate its younger generations about contemporary and traditional Chemehuevi life. The tribe operates the Havasu Landing Resort & Casino (Chemehuevi Indian Tribe 2014b, 2014c, 2014d, 2014e).

The Twenty-Nine Palms Band of Mission Indians is a federally recognized tribe of Chemehuevi people whose reservation is near Coachella. The tribe consists of descendants of those who traditionally inhabited the desert area of the Oasis of Mara (Mar'rah) near the City of Twentynine Palms and Joshua Tree National Park. Most of the tribe moved to the Morongo Reservation in 1908 because of the Office of Indian Affairs determination that the tribal children needed to attend school there. In 1910, the tribe was granted 640 acres with the Cabazon Band of Mission Indians, a reservation that was divided between the groups in 1976. The tribe is governed by a tribal council consisting of every enrolled member over the age of 18, presided over by a Tribal Chairperson, a Tribal Vice-Chairperson, and a Tribal Secretary. The Twenty-Nine Palms Band owns and operates the Spotlight 29 Casino and is currently pursuing the establishment of another, the Tortoise Rock Casino. The Twenty-Nine Palms Band have appointed a THPO to represent them in cultural resources matters (Twenty-Nine Palms Band of Mission Indians 2014).

The Western Shoshone occupied a region that included Death, Panamint, and Saline valleys in Eastern California through the highlands of Central Nevada into Northwestern Utah including Skull and Deep Creek valleys (Norwood et al. 1980, Thomas et al. 1986).

The Timbisha Shoshone Tribe, in California, is a federally recognized tribe. It currently has approximately 306 tribal members and occupies a 7,914-acre reservation, comprised of several parcels in and around Death Valley National Park, including a 314-acre parcel near Furnace Creek, California. Some reservation parcels are located in Nevada near Uda,

Scotty's Junction, and Death Valley Junction. The tribe also has several areas that are co-managed with the National Park Service or BLM.

The tribe's main office is in Bishop, California. The tribe was originally represented in the 1863 treaty of Ruby Valley. However, that treaty did not result in any specific representation for the Timbisha Shoshone, who fought for and eventually achieved federal recognition in 1983. However, the tribe did not receive a land base until 2000 with the passage of the Timbisha Homeland Act. The tribe holds general elections; it is led by a chairperson and holds monthly meetings. A Tribal Historic Preservation Office manages the tribe's cultural programs.

The Owens Valley Paiute, also called the Eastern Mono, occupied a narrow valley along the Owens River on the eastern side of the southeastern Sierra Nevada. Owens Valley Paiute territory extends north to Benton, California, and east to Fish Lake Valley, Nevada (Liljeblad and Fowler 1986; Norwood et al. 1980; Steward 1933). Five separate tribes represent the Owens Valley Paiute. All of the tribes are members of the Owens Valley Indian Water Commission. In the 1860s, the discovery of gold and silver in the Sierra Nevada and Inyo mountains attracted a flood of prospectors, who were later followed by ranchers and farmers, who often utilized Paiute irrigation systems and grasslands. A harsh winter and scarce food in 1861-1862 resulted in conflicts between the Paiute and settlers. In 1863 the military intervened and forcibly removed 1,000 Paiute to Fort Tejon in the mountains south of Bakersfield (NPS 2014a). Many Paiute eventually left Fort Tejon and returned to the Owens Valley where they lived in camps near towns and farms. They integrated farm and domestic labor with traditional food gathering, and by 1866 were indispensable to the Owens Valley's agricultural economy.

In 1912 the government set aside over 67,000 acres of reservation land in the Owens Valley for the Indians of this area. In 1932 President Hoover revoked the 67,000 acres reserved land and placed the lands in watershed protection status for the City of Los Angeles. In 1936 the City of Los Angeles wanted the remaining lands and the federal government traded these lands for the 875 acres that now comprise the Bishop Paiute Reservation located at the base of the Eastern Sierra Nevada Mountains (Bishop Paiute Tribe 2014). Currently, the Owens Valley Paiute belong to five federally recognized tribes: Lone Pine Paiute, Fort Independence Paiute, Big Pine Paiute, Utu Utu Gwaitu Paiute, and Bishop Paiute.

The Lone Pine Paiute Tribe of Lone Pine, California, is a federally recognized tribe. The tribe consists of approximately 425 tribal members and a 237-acre reservation near Lone Pine, California. The tribal government consists of a general council that holds monthly meetings. Some Lone Pine Paiute Tribal members are of Timbisha Shoshone descent.

Cultural resources issues are managed through the tribal Environmental Protection Program (Gates 2012).

The Fort Independence Paiute Tribe is a federally recognized tribe with a reservation on the site of a U.S. Army camp. The 580-acre reservation is located near Independence, California, and was established in 1915. The tribe consists of 136 members, roughly half of whom live on the reservation. The Tribal government, consisting of a chairman, a vice chairman, and a tribal administrator, was established in 1965. As of 2005, cultural resources issues are handled by their THPO (Fort Independence Indian Reservation 2005).

The Big Pine Paiute Tribe of the Owens Valley is a federally recognized tribe with approximately 403 enrolled members and a 279-acre reservation near Big Pine, California. Tribal government consists of a constitutionally established Tribal Council and a General Council. The Tribal Council holds monthly meetings; the General Council meets quarterly. The Big Pine Tribe's cultural resources program is managed by a THPO (Gates 2012).

The Utu Utu Gwaitu Paiute Tribe, previously referred to as the Benton Paiute, is a federally recognized tribe. Tribal membership is approximately 138 people, and their reservation, near Benton, California, is 162 acres in size. The tribal government consists of the Utu Utu Tribal Council, which meets monthly, and the General Council of all members, which meets annually (Gates 2012).

The Paiute-Shoshone Indians of the Bishop Community is a federally recognized tribe. The 875-acre reservation is located near Bishop, California, and tribal enrollment stands at approximately 1,040 members. The governing body of the tribe is the Bishop Indian Tribal Council. The Bishop Paiute Tribe's cultural resources program is maintained through a Tribal Historic Preservation Office (Gates 2012).

The Kitanemuk lived in the Tehachapi Mountains at the southern end of the San Joaquin Valley with Antelope Valley being their southern boundary (Blackburn and Bean 1978; Kroeber 1925). The most widely known Kitanemuk settlement was located at Tejon Creek, just south of Tehachapi Valley, and was first visited by the Spanish in 1776 who estimated the Kitanemuk population to be between 500 and 1,000. The introduction of the Spanish mission system into Kitanemuk life brought changes similar to those experienced by other indigenous groups in California. Most Kitanemuk were assimilated into life at Mission San Fernando and Mission San Gabriel Arcangel in the Los Angeles area, while others remained near Tejon Creek and became ranch hands. They established Fort Tejon and referred to themselves as the Tejon Indian Tribe.

In 1864, the Tejon Agency formed the Tule River reservation near Bakersfield, California, and relocated a small Kitanemuk community to this location that still resides there today.

Currently, two groups of Kitanemuk have stayed close to their ancestral land near Tejon Creek: (1) the Tinoqui-Chalola Council of Kitanemuk and Yowlumne Tejon Indians; and (2) the Tejon Indian Tribe. In 2012, the Tejon Indian Tribe became a federally recognized tribe (Haramokngna American Indian Cultural Center 2014).

Serrano territory generally encompassed the San Bernardino Mountains east of Cajon Pass, east to Twentynine Palms and south to Yucaipa Valley (Bean and Smith 1978). When an *asistencia*, an outpost of the San Bernardino mission, was established at Redlands in 1819 the Spanish forced most of the Western Serrano into the missions away from their homeland. Those who were located in the area north of San Gorgonio Pass, near Banning, California, were able to preserve what remains of Serrano culture today (Bean and Smith 1978). Oral history accounts of a massacre in the 1860s at Twentynine Palms may have been part of a larger American military campaign in the region that lasted 32 days (Bean and Vane 2002; Mission Creek Band of Indians 2014). Surviving Serrano sought shelter at Morongo with their Cahuilla neighbors; Morongo later became a reservation (Bean and Vane 2002). Other survivors followed the Serrano leader Santos Manuel down from the mountains and toward the valley floors, and eventually settled in what later became the reservation of the San Manuel Band of Mission Indians, a federally recognized tribe. Other Serrano descendants belong to the San Fernando Band of Mission Indians and Morongo Band of Mission Indians.

The San Manuel Band of Mission Indians reservation was established in 1891 and encompasses 800 acres in the Southern California foothills of the San Bernardino Mountain region. The reservation contains within it gaming operations and other enterprises that ensure the tribe's self-sufficiency. They have an established General Council and a seven-member Business Committee that are elected by the Council (San Manuel Band of Mission Indians 2014).

The San Fernando Band of Mission Indians, also called the Fernandeño Tataviam Band of Mission Indians, are primarily descendants of Tataviam-speakers from northern Ventura and Los Angeles counties, specifically San Fernando and Santa Clarita valleys, and parts of Antelope Valley. However, the tribe is listed by the NAHC as a consulting tribe for Serrano descendants in Los Angeles and San Bernardino counties (NAHC 2014). In 2002, the Fernandeño Tataviam Band of Mission Indians officially adopted a constitution. Members of the band are governed by a nine-member Tribal Senate. Recently, the tribe established a Web development company called Pahi Creative Group Ltd that offers low-cost Web development services to native nonprofits (Fernandeño Tataviam Band of Mission Indians 2014).

The Cahuilla occupied mountains, passes, canyons, valleys, and desert from the Colorado Desert north of the Chocolate Mountains and across to Borrego Springs, westerly along

Palomar Mountain, northerly to the Santa Ana River near Riverside, then easterly along the San Bernardino Mountains to Orocopia Mountain, and encompassing the San Jacinto and Santa Rosa mountain ranges (Bean 1978).

Cahuilla leaders Juan Antonio and Cabeson, among others, acted as negotiators for the treaties between the Cahuilla and the U.S. Government in 1851. Reservations were established for the Cahuilla in 1875 and they were able to maintain their traditional patterns in combination with wage labor until about 1891, when federal supervision of the 10 Cahuilla reservations increased. This supervision included enrollment in government schools and cultural suppression of traditional Cahuilla lifeways (Bean 1978). Today, Cahuilla reside on eight different reservations in and around the San Jacinto Mountains and Coachella Valley.

The Agua Caliente Band of Cahuilla Indians were granted the Agua Caliente Indian Reservation in 1907 dedicating all even-numbered township-range sections to the tribe and all odd-numbered sections were set aside to entice the construction of a transcontinental railroad. The Agua Caliente Band consists of smaller tribal groups that were living in the area at the time the reservation was established in the 19th century. By 1959, individual Indian allotments were finalized and certain lands were set aside for ceremonial use. Represented by a five-member tribal council, The Agua Caliente Band and its members embody the largest single landowner in Palm Springs. The Agua Caliente have appointed a THPO to represent them in cultural resources matters (Agua Caliente Band of Cahuilla Indians 2014).

The Augustine Band of Cahuilla Indians were granted the Augustine Reservation was by Congress in 1891. They are based in Coachella and are the smallest tribal nation comprised of six descendants of Roberta Augustine, the last surviving adult member of the tribe, who passed away in 1987. In 2002, 20 acres of reservation land were used to construct the Augustine Casino, a small casino that has thus far helped the Augustine Band achieve cultural self-sufficiency (Augustine Band of Cahuilla Indians 2010, Planet Palm Springs 2013).

The Cabazon Band of Mission Indians received the federal land grant for the Cabazon Indian Reservation in 1876 for the 600-member Tribe. The Reservation is defined by three parcels of desert totaling 2,400 acres. Currently, the Cabazon Band of Mission Indians consists of fewer than 35 members who are descendants of their heroic leader of the mid-nineteenth century, Chief Cabazon. In 1987, the tribe was the first to establish nonregulated gaming in the form of a high-stakes bingo facility, setting the stage for the future Indian gaming industry. The largest parcel of land contains the tribal office and the Fantasy Springs Casino, which is owned and operated by the Tribe (Indian Gaming 2008).

The Cahuilla Band of Mission Indians resides on the Cahuilla Indian Reservation, which was established in 1875 and occupies 18,884 acres. It is located about 25 miles east of Temecula and 35 miles west of Coachella Valley, and based out of Anza (United States Bureau of Indian Affairs 2012). The Cahuilla Band currently has 325 enrolled members. The Cahuilla tribal government consists of a 5-member tribal council elected by the general membership. The Council consists of a tribal chairperson, a vice chairperson, a secretary, and two council members. In addition, various tribal committees are appointed to address specific government functions within the tribe. Major sources of income for the tribe include the Cahuilla Casino, the Cahuilla Travel Website, and the Cahuilla Smoke Shop. In addition, the tribe has recently allocated 2,000 acres for future economic development, including renewable energy development, commercial warehousing, and a gas station/convenience store (Cahuilla Band of Indians 2013).

The Los Coyotes Band of Cahuilla and Cupeño Indians occupy the Los Coyotes Indian Reservation. This is the largest Native American reservation in San Diego County, encompassing 25,000 acres. The Reservation is located about 15 miles northwest of the Anza-Borrego Desert State Park. The Mountain Cahuilla Tribe consists of 328 enrolled members, 82 of whom reside on the Los Coyotes Indian Reservation. The Los Coyotes band established the Los Coyotes Campground and Horsecamp on their property and opened the reservation to tourists and other visitors as a means of income (Los Coyotes Indian Reservation 2012).

The Morongo Band of Mission Indians was granted the Morongo Indian Reservation in 1865, spanning 35,000 acres at the foot of the San Jacinto and San Gorgonio mountains. The Morongo Band contains a mixture of several small diverse groups including the Serrano, Cahuilla, and Cupeño. In 1983, the Tribe established a small bingo hall that has since evolved into one of the oldest, most successful Indian gaming facilities in California. The Morongo Casino, Resort, and Spa is the largest of its kind in the nation. The Tribe is a major contributor to the economy of Coachella Valley and has also become the largest private sector employer in the Banning-Beaumont region, employing over 3,000 people (The Morongo Band of Mission Indians 2014).

The Ramona Band of Cahuilla are descendants of the Apapatcem Clan, which originally settled the Ramona Indian Reservation, established in the Sauppalpisa Territory in 1893 and spanning 560 acres at the base of Thomas Mountain in Anza. The Ramona Band is a Mountain Cahuilla tribe and is the first Tribe to develop an entirely off-grid reservation, using renewable energy as their primary power source. The Tribe's members and families live in residences powered by hybrid electrical systems including solar and wind turbines. In 2009, the Tribe received the 2009 Environmental Achievement Award from the Environmental Protection Agency. Currently they are working to establish an Eco-Tourism

Cultural Resort as a profitable renewable-energy business, where electricity will be distributed via an underground mini-grid (Ramona Band of Cahuilla Indians 2008).

The Santa Rosa Band of Cahuilla Indians resides on the Santa Rosa Reservation, which consists of four noncontiguous parcels spanning 11,021 acres. The Santa Rosa Band is a Mountain Cahuilla tribe comprised of descendants from three Cahuilla bands that traditionally inhabited areas of Toro Peak, Garner Valley, Coyote Canyon/Anza-Borrego, Pinion, and the Santa Rosa Indian Reservation, located in Riverside County. The largest parcel of land, New Santa Rosa, is used as residence land for members, and the tribe operates a telecommunication relay station at Toro Peak. The Santa Rosa Band of Cahuilla Indians recognizes 110 tribal members, 70 of whom live on the Reservation. It is represented by a 7-member Tribal Council (Santa Rosa Band of Cahuilla Indians 2011).

The Torres Martinez Desert Cahuilla Indians reside on the Torres Martinez Reservation that was established in 1876 and spans 24,000 acres in Imperial and Riverside counties near the Salton Sea. The Tribe is named after its reservation and an early village named Toro and the Martinez Indian Agency, which was located in Coachella Valley. Currently there are about 90 members in the Tribe. The Reservation contains desert as well as private agricultural land that is one of the most productive agricultural areas on the nation. In 2007, the Torres Martinez Desert Cahuilla Band established the Red Earth Casino consisting of a gas station, travel center, sandwich shop and café. The Tribe also has plans to open another casino in the near future.

Cultural Characteristics for Numic and Takic Language Speakers

Cultural characteristics similar for Numic and Takic language speakers in the Mojave Desert include diagnostic point types and pottery made using either the coil and scrape or paddle and anvil technique (Bean 1978; Bean and Smith 1978; Thomas et al. 1986). Four point types may be associated with contact-period populations in the Numic/Takic language area: Rose Spring, Eastgate, Cottonwood, and Desert Side-notched. These tribes also traditionally cremated their dead with the exception of the Kitanemuk and Kawaiisu (Blackburn and Bean 1978; Garfinkel and Williams 2009; Kelly and Fowler 1986; Strong 1929; Zigmond 1986).

The Western Shoshone and Owens Valley Paiute practiced both cremations and burials (Busby et al. 1979; Thomas et al. 1986). The Cahuilla and Southern Paiute (Chemehuevi) also were agriculturalists and the Owens Valley Paiute practiced a specialized irrigation system to grow crops (Bean 1978; Busby et al. 1979; Kelly and Fowler 1986; Steward 1933). Sutton et al. (2007) suggest a geographic difference for artifact types. They note that the Northern Mojave Desert or the Numic language areas have a combination of Desert Side-notched and Cottonwood triangular points, brownware pottery, some

buffware pottery near the Mojave River, and primarily Coso obsidian artifacts. The eastern portion of the Mojave Desert, also representing Takic language areas, has only Cottonwood triangular points, brownware and buffware pottery, and local obsidian artifacts. The Mojave River appears to have been a boundary between the Takic and Numic speakers (Sutton et al. 2007).

III.8.2.4 Historic Period

Initial Exploration by Europeans

The term historic period generally is defined as the period after initial contact between Native American groups and European explorers/settlers, when written sources about the area began. An arbitrary date for the beginning of the historic period for California would be 1540, with the expedition of Spanish explorer Hernando de Alarcon. Alarcon's expedition brought the first Europeans to what is now the LUPA Decision Area also referred to as the California Desert Region in this report. The expedition sailed up the Colorado River as far as the confluence of the Colorado and Gila rivers (Woznicki 1968). In the same year, Melcior Diaz led an expedition by foot up to the confluence of the Colorado and Gila rivers. In 1700, Father Eusebio Francisco Kino traveled from Sonora, Mexico, to the Yuma area, and for the next few years Spanish priests and missionaries moved up and down the Colorado and Gila rivers, visiting the tribes.

Exploration into central and northern portions of the California Desert Region was slower and more intermittent. While searching for potential mission sites in 1771, Father Francesco Tomas Garcés crossed the Colorado River at Yuma and traveled west into the Colorado Desert. He continued west to the vicinity of the San Jacinto Mountains before turning back to the Colorado River. In 1772 Pedro Fages, a Spanish army officer and commander of California's Spanish force, crossed into (what is now) the California Desert Region while following a band of runaways from the presidio at San Diego. His chase appears to have led him through the San Bernardino Valley, over to the high desert near Cajon Pass, and into the Mojave Desert before proceeding on to the south end of the San Joaquin Valley and on to Monterey (Greene 1983).

The opening of the mission system in 1769 created the need to link Alta California with Sonora, Mexico. Juan Bautista de Anza of Tubac, accompanied by Father Garcés and Father Juan Díaz, was commissioned to open a road across the Colorado Desert to San Gabriel and on to Monterey (Rolle and Verge 2008). The first de Anza Expedition in 1774-1775 entered Alta, California, at Yuma and proceeded to San Gabriel, establishing the Anza Trail as an overland route from New Mexico to the Pacific Coast (Lawton 1976).

A second Anza expedition in 1775-1776 explored portions of the central California Desert Region (Malouf and Findlay 1986). Father Garcés accompanied this troop initially, but split off from the main group at Yuma and traveled along the Colorado trail up to the vicinity of present-day Needles. He then crossed the width of the Mojave Desert via the Mojave Indian Trail, becoming the first European to do so (Greene 1983).

In 1780 the military commander of the Sonora district established Mission Puerto de Purisima Concepción, the only Spanish mission within the California Desert Region. The mission and associated pueblo were located on the west bank of the Colorado River at Yuma, where the Anza Trail crossed the Colorado River (California Department of Parks and Recreation 1990). Purísima mission was placed in charge of Father Francisco Garcés, the explorer, with Father Juan Barreneche as his assistant (Access Genealogy 2012). A second mission, Mission San Pedro y San Pablo de Bicuner, was set up 8 or 10 miles lower, possibly just across the present Mexican border and outside the LUPA Decision Area. Both missions were abandoned permanently after the missionaries and a small garrison were killed during the Quechan rebellion of July 17-19, 1781 (Access Genealogy 2012; California State Parks 1990; Rolle and Verge 2008). Although military and civilian expeditions passed through the Yuma area after the rebellion, Spanish and later Mexican control of the area was lost (Bee 1983). Effective Anglo-European control was eventually re-established with the construction of Camp Independence (later Fort Yuma) by the U.S. Army in 1849 (California State Military Museum 2011a).

Trails, Trading Routes, and Transportation

Many historic trails, roads, and trading routes, were originally used by Native Americans in prehistoric and ethnohistoric times (see Sections III.8.2.1 and III.8.2.2). As noted earlier, the first Spanish period trails in the California Desert Region were pioneered by the de Anza Expeditions in 1774-1775 and 1775-1776. Mexico gained its independence from Spain in 1821, but travel in what is now the California Desert Region was still limited. Travel on the existing trails in the California Desert Region increased after restrictions against private traders were lifted. American trappers and traders began working the northern portion of the California Desert Region in increasing numbers in the early 1800s, including groups led by Jedediah Smith in 1826-1827 and Peter Ogden in 1829-1830. Both groups came into California in the region of Needles and moved west through the Mojave Desert, using the Mojave Indian Trail, and then north into the San Joaquin Valley (Malouf and Findlay 1986).

A primary route for the growing trade was the Old Spanish Trail, pioneered as a trade route between New Mexico and California by Antonio Armijo in 1829 (Beck and Haase 1974). The Old Spanish Trail began in Santa Fe, New Mexico, and ended at the Pacific Ocean at the Pueblo of Los Angeles. Armijo's route included portions of the routes blazed

by de Rivera, Dominguez and de Escalante, and Jedediah Smith (Malouf and Findlay 1986). The portion of the trail route within the California Desert Region followed the Mojave River west past what is now Barstow, then southwest through the Cajon Pass to Mission San Gabriel and on to Los Angeles (Beck and Haase 1974). Many American trappers and traders used the Old Spanish Trail and it became increasingly important to trade in the 1830s. The Mojave River Valley was also a popular route for horse and cattle thieves and Native American slave traders bound for established settlements in New Mexico (Malouf and Findlay 1986). The trail is now designated a National Historic Trail. For more details, see the end of Section III.8.3.

The first railroad line in the southern portion of the California Desert Region was the Southern Pacific Railroad line to Yuma in 1876 (Engstrand 2005). The establishment of several sidings (short stretches of railroad track used to store rolling stock along the route), including one at Ogilby, greatly increased access to the area and consequently mining increased at a rapid pace in the Cargo Muchachos Mountains (Morton 1977).

Southern Pacific Railroad started railroad service between Yuma and Indio in 1877, with a track running through Imperial Valley, which increased the exploitation of the region's mineral resources (Clark 1970; Heath 1945). The Southern Pacific Railroad constructed a line from Mojave to Needles, on the Colorado River, between 1882 and 1883, which also increased the exploitation of the regions' mineral resources (Feller 2013). Numerous watering stations for locomotives were set up along the route, to which wagon roads from mines in the Mojave Desert were constructed, significantly decreasing the cost of supplying the mining operations in the area (Hatheway 2001) The town of Barstow, originally named Fishpond and later Waterman, was incorporated in 1886 as a town for railroad workers (Hart 1987). The establishment of a main transfer station at Yermo, 10 miles from Barstow, resulted in significant growth in Barstow (Hector 1987).

The completion of the San Pedro, Los Angeles, and Salt Lake Railway line from Salt Lake City, Utah, to Barstow in May 1905 further increased the town's importance (Burbank 2009; Strack 2012). Much of the route ran through only sparsely inhabited areas in the California Desert Region, Barstow being the only town of any size. Although not a large town, Kelso, on the line east of Barstow, was a major staging stop for the railroad.

Numerous small railroads were constructed in the California Desert Region for the express purpose of servicing mining operations. The Borate and Daggett Railroad, constructed in 1898, was used to haul borate the dozen miles from the mines at Borate to the Southern Pacific line at Daggett (Ross 2002). Many Navajo Native Americans and Mexicans worked on the construction of the line. The Borate and Daggett ran for 9 years, carrying mail and passengers in addition to its main cargo of borate (Ross 2002).

The Carson and Colorado Railroad was incorporated in 1880 and ran from Mound House, Nevada, to Keeler, California, below the Cerro Gordo Mines on the east side of Owens Valley. Much of the route paralleled U.S. 395. The Southern Pacific Company bought the line in 1900, renamed it the Nevada and California Railway in 1905, and in 1912 it was renamed again the Southern Pacific. Portions of the railway lines closed in the 1930s and 1940s. The final portion from Laws to Keeler was abandoned in 1960 and the rails were removed in 1961 (Turner 1965).

The Tonopah & Tidewater Railroad, constructed between 1905 and 1907, was a 170-mile rail line that ran from Ludlow, California, to Beatty, Nevada. The line went through Death Valley Junction, where borax from the borax mines in Death Valley was loaded onto railcars for shipment. Both cargo and passenger trains operated on the line. The Pacific Coast Borax Company began shutting down operations in Death Valley in 1928, which dealt a substantial blow to the revenue of the railroad. The line continued to run reduced operations for several years afterword, but finally closed down in June 1940 (Jennings and Wyant 1976).

The Ludlow & Southern Railway, constructed in 1902 and completed in June 1903, ran from the Buckeye Mining District north to Ludlow, where it connected to the Atchison, Topeka, & Santa Fe Railroad. The small town of Rochester was the southern terminus of the railroad, a company town owned by the Bagdad Chase Gold Mining Company. The railroad closed down in 1916 when the gold mine shut down, but the line kept up until 1932 when a large segment was washed out (Ross 2000). After that, the line was abandoned.

When the railroad route from Barstow to Needles was constructed in 1882 by the Southern Pacific Railroad, a dirt road was also established adjacent to the tracks (Feller 2013; Hatheway 2001). This road was most likely built as part of the construction of the railroad, but was soon used for wagons. Through the rest of the 1800s and into the first decade of the 1900s, the road had light use because the train provided a much more cost-effective way of transporting people and goods through the area. After the turn of the century, however, the rise of the automobile made the road a potential route from Nevada to the West Coast. The San Bernardino County improved the existing dirt road in 1911 (Hatheway 2001), possibly to entice the State of California to adopt the route as a highway. Plans were being formed for a highway connecting the East Coast and West Coast, and the Needles to Barstow to Los Angeles route, later known as Route 66, was one of the main routes considered.

U.S. 66 was designated in 1926 when a national numbering system plan for U.S. highways first took effect (Roland et al. 2011). It was originally part of the National Old Trails Road, the nation's first transcontinental highway formed in 1912 as the result of the efforts of road advocacy groups in Missouri (Roland et al. 2011; Weingroff 2013). The National Old

Trails Road extended 3,096 miles from Washington, D.C., to Los Angeles, California, crossing 12 states (Lowe 1925). For most of the route west of Albuquerque, the route of the National Old Trails Road became U.S. 66, though much of it across the Mojave Desert still bears the name of the Old Trails Road (Roadside Photos 2014). U.S. 66 has been evaluated as potentially eligible for the NRHP and is part of the National Park Service multistate Route 66 Corridor Preservation Program (NPS 2014a).

Mining

Mining has been a recurring and significant factor in the development of the California Desert Region. Father Garces first discovered gold in the Colorado Desert in 1776, in the area of the Cargo Muchacho Mountains north-northwest of Yuma (Hector 1987). Limited mining took place during the Spanish Period in the Cargo Muchachos and Southern Chocolate mountains along the Colorado River in dry placer deposits. These consisted mainly of small claims worked by a few individuals (Greene 1983). The cost and difficulty of working these few prospects on hillsides and dry washes and the Quechan rebellion of 1781 led to their eventual abandonment (Morton 1977).

Mining restarted in the Cargo Muchacho Mountains during the 1830s (Morton 1977). The prospects again consisted mostly of hand-dug shallow pits, and the ore was processed by hand (Hector 1987). Like the initial finds in the Spanish period, the difficulty in working the mines restricted development.

Although not initially extensive, mining was probably the most common reason for settlement in much of the California Desert Region after the American acquisition of California on February 2, 1848 (Rolle and Verge 2008). The Cargo Muchacho–Tumco Mountain Mining District, also known as the Cargo Muchacho–Tumco District, near Yuma, was established in an area originally opened in the early 1780s by Spanish prospectors. Initially, mining operations were on a small scale due to the harsh conditions and difficult access. Mining conditions changed dramatically in 1877 with completion of the Southern Pacific Railroad line to Yuma. After the establishment of the railroad, mining increased at a rapid pace in the Cargo Muchachos, with several mines opening up in the late 1890s. Mining in the area continued well into the early 1900s, and then intermittently from about 1910 to the late 1930s (Clark 1970).

By the early 1850s, gold deposits had been discovered in San Bernardino County around Leach Lake and Lytle Creek. In the early 1860s, gold was discovered in the Picacho Peak area south of Blythe and in the Bear and Holcomb valleys in the San Bernardino Mountains. In the 1870s, gold mining began in earnest in the Little San Bernardino and Eagle mountains (Riverside County), near Twentynine Palms and Joshua Tree National Park. A military survey party led by Colonel Henry Washington explored the oasis at Twentynine

Palms in 1858 (Greene 1983). At its height of operations, the area supported numerous mining districts (Clark 1970). At its full extent the area in and around the park supported numerous mining districts, including Twentynine Palms, Washington, Gold Park, Piñon, Cottonwood, Eagle Mountain, Iron Mountain, Monte Negras, Rattler, and Dale (Clark 1970; Greene 1983). The Dale mines yielded more than $3 million in gold before the turn of the century. By the 1890s, mining operations were sufficient to warrant the development of haul roads, linking the remote mining districts with towns like Indio and Mecca.

One major mining area, the Buckeye Mining District, opened up as a result of the Southern Pacific line from Mojave to Needles. This district was located in the mountains south of the rail line and approximately 50 miles east-southeast of Barstow. Two of the principal mines begun in the area in the late 1880s were the Bagdad and Roosevelt mines, established by John Suter. A rich gold ore deposit was found in the late 1890s, after Suter had sold the claims. The first shipment of ore was delivered to the Randsberg-Santa Fe reduction company's stamp mill in Barstow in 1901. A second mining company, the Benjamin E. Chase Gold Mining Company, had been set up in the Buckeye district. Chase was also the president of the Ludlow & Southern Railway, which was built in 1903 to transport ore form the Chase mines to the railhead at Ludlow. The two operations merged in 1904, and between then and 1910 it was the largest gold-producing operation in San Bernardino County. It was also the largest copper-producing operation in the county. Gold production fell after 1910, and the mines were worked intermittently from 1910 to the 1970s (Ross 2001).

A mining boom started in the Mojave Valley in 1860 after Robert W. Waterman and John L. Porter discovered silver (Hector 1987). By the early 1880s the Calico Silver Mining District was established, and the town of Calico was founded in 1881 along the Mojave River. Silver deposits were also discovered around Ivanpah, which became a major mining district in the 1870s, and in the Providence Mountains in the 1870s and 1880s (Greene 1983). In addition to silver and gold, borate deposits were found in 1882 north of Daggett by Hugh Stevens and Bill Neel (Ross 2002). Mining commenced soon after, and in 1888 the most promising claims were purchased by Francis M. Smith, who also owned the borax mines in the Death Valley area (California Department of Transportation 2008).

Mining in the Death Valley–Furnace Creek area was slow to develop due to transportation difficulties. The Telescope Mining District, organized in 1860, was located just west of Death Valley on a spur of the Panamint Range. Worked only marginally in the beginning, by the late 1860s a substantial mining district had developed (Greene 1981). Mormon immigrants traveling west discovered gold in 1854 and 1856 in the Amargosa River area (Norwood et al. 1980). Silver was found in the Panamint Range in 1858, and the area was worked with limited success in the 1860s. Beginning in the 1880s a revival of gold mining in the Panamint Mountains occurred, centered in the Tuber Canyon area (Greene 1981).

The towns of Ballarat and Garlock developed as a result of the mining industry in the Panamint Mountains.

One of the most successful mining operations in the Death Valley area during the late 1800s was the Harmony Borax Works. In 1881, William T. Coleman formed the Greenland Salt and Borax Mining Company, which began operating the Harmony Borax works north of Furnace Creek in 1882 (California Department of Transportation 2008, Greene 1981). The operation mined borate that formed on the surface of the salt flats, called "cottonballs." Coleman also ran another borate mining operation, the Amargosa Borax Works, near Resting Springs. The Amargosa Borax Works operated during the summer months when work in the valley was suspended because of extreme heat. (Greene 1981). It was from the Amargosa works that the famous 20-mule teams hauled the borate to the Daggett railhead, a 330-mile round trip (Zentner 2012). In 1883 a richer type of borate, occurring underground, was discovered south of Furnace Creek and subsequently southwest of Death Valley Junction. In 1890 Francis M. Smith acquired the borate mines in the Death and Amargosa valleys, Furnace Creek, and Borate, consolidating them all under the Pacific Coast Borax Company (California Department of Transportation 2008). Smith closed down all the works except the borate works, which could be worked most profitably (Greene 1981). Borate became the main producer of borax and boric acid in the United States between 1890 and 1907.

Numerous silver mines were also established during the early 1860s in the Coso Range, resulting in the establishment of the Coso Mining Company and the Coso Gold and Silver Mining Company, among others (Norwood et al. 1980). Mining success fluctuated greatly in these areas and was never as successful as some other areas. A third mining area was established in 1865 in the Inyo Range on the southeast side of the Owens Valley, centered at Cerro Gordo. This area was very productive, and by 1868 the Union Mine at Cerro Gordo was the most productive silver mine in the United States (Norwood et al. 1980).

In addition to gold and silver, salt was mined in the Saline Valley east of Independence. Salt mining began in 1864, but transportation costs kept the enterprise from growing to a major operation (Norwood et al. 1980). The Saline Valley Salt Company constructed the Saline Valley Salt Tram between1911 and 1913 to transport salt over the Inyo Mountains to Owens Valley where it was then shipped via railroad (Ver Planck 1958). It was the steepest tram in the United States rising from 1,100 feet in the Saline Valley to 8,500 feet at the crest of the Inyo Mountains, and then dropping to 3,600 feet in Owens Valley. The tram is on the National Register of Historic Places (#74000514) (Conrad 1973). The Saline Valley Salt Company was bought out by the Owens Valley Salt Company in 1915, which continued to mine salt until 1918 when it closed operations. Salt mining continued on an intermittent basis by various companies until 1930 when the Sierra Salt Company closed (Ver Planck 1958).

Agriculture and Ranching

As a result of the mining operations in the area around the Owens and Panamint valleys, farmers and cattlemen also moved into the area, especially the Owens Valley, to supply food to the miners. The influx of Americans into the area resulted in conflicts with the indigenous Native American groups (Norwood et al. 1980). In 1862, the Army established Camp Independence in Owens Valley to quell Native American–White miner violence that had broken out in the area. Temporarily abandoned in 1864, the camp was re-occupied in 1865 after violence again broke out, and remained active until abandoned in March 1877 (California State Military Museum 2011c).

After an initial, unsuccessful attempt to irrigate the Imperial and Coachella valleys by Dr. O.M. Wozencraft between 1859 and 1887, Charles R. Rockwood developed a plan to irrigate 1,250,000 acres in the Imperial Valley in 1892 (Dowd 1956). Rockwood set up the California Development Company in 1896 to implement his plan, and the first canal was completed in 1901. A plan to improve the canal backfired in the winter of 1905, when the flooding Colorado River broke through a levee in Mexico and diverted almost its entire volume into the Imperial Valley, creating the Salton Sea (Dowd 1956). The breach was not permanently closed until February 1907 by the Southern Pacific Railroad. The Imperial Irrigation District, the current supplier of water to the Imperial Valley, was set up in 1911 (Dowd 1956). Around Blythe, the Palo Verde Joint Levee District was set up in 1917 to control periodic flooding (Palo Verde Irrigation District History 2005). Hoover Dam, completed in 1935, put an end to periodic flooding of the lowlands around the Colorado River (Rolle and Verge 2008).

Indigenous agriculture had existed in the Owens Valley, along the Colorado River, and at various springs throughout the California Desert Region well before the Spanish arrived (see Section III.8.2.1). Historic-era agriculture in the Owens Valley provided food for the miners who flocked to the region following the discovery of gold in San Bernardino in the 1850s. Although the area received little rain, the Owens River supplied enough dependable water for irrigation. By the beginning of the twentieth century, the city of Los Angeles was experiencing a severe water shortage and it was proposed to William Mulholland, president of the Los Angeles Water Department, that the Owens River be tapped to supply Los Angeles with water (Norwood et al. 1980). Los Angeles voters approved a $23 million bond, water rights were purchased, and an aqueduct was completed by 1913. The diversion of water to Los Angeles did not immediately impact agriculture in the Owens Valley, but a drought in 1921-1922 began a decline that ended farming in the area by the mid-1930s (Norwood et al. 1980).

During the 1880s, the area around Twentynine Palms began to be used as a cattle range, with a number of large cattle companies based in the Banning and Big Bear areas running

their herds from Morongo Valley to Twentynine Palms (California State Military Museum 2011g). Ranches in the area included the Barker and Shay Ranch, Jim Mart's "I-S" outfit, the Chase and Law Ranch, and the Talmadge brand, all of which used the area during the winter months. Warren's Well was also the gathering point for the spring and fall cattle roundups until World War II (California State Military Museum 2011g).

Military Installations

The first military installation in the California Desert Region was Camp Independence, established in 1849 to guard the Yuma ferry crossing, an important point on the overland route to California (Mikesell 2000). Originally established in the Colorado River floodplain, the camp was moved to a small hill on the California side of the river in 1851 and renamed Fort Yuma (California State Military Museum 2011a). Fort Yuma continued to be an important stop on the route to California, and in 1854 the town of Yuma was laid out. In 1857, James E. Birch began a stage line from San Antonio, Texas, to San Diego, California, which crossed the Colorado Desert west of Yuma, went south into Mexico for 50 miles around the Imperial Valley Sand Dunes, moved northwest to Carrizo Creek, proceeded to Vallecitos, and finally traveled southwest to San Diego (Pourade 1963). Fort Yuma was abandoned temporarily in 1851, re-occupied in 1852, and permanently abandoned in May 1883 (California State Military Museum 2011a).

Captain James H. Carleton established a chain of military posts in San Bernardino County between 1859 and 1860. These posts were created to protect the travel route, called the Old Government Road, from San Bernardino across the Mojave Desert to Fort Mojave, near Needles (Hector 1987). The posts were garrisoned by elements of the California Volunteers during the Civil War, and most were evacuated at war's end. Due to local concerns for protection of the travel route and increasing mining activity, the posts were re-occupied in 1866 (California State Military Museum 2011b).

Two of the more substantial posts were Fort Piute and Camp Cady. Fort Piute was established about 25 miles northwest of Fort Mojave, and Camp Cady was located about 20 miles east of Barstow. Both had permanent buildings constructed of either adobe or rock. Both also had histories of abandonment and re-occupation, with Fort Piute finally being abandoned in 1868 and Camp Cady in 1871 (California State Military Museum 2013a).

As cattleman and ranchers moved into Owens Valley and cattle grazed on the Paiute food supply, the Paiute stole and killed some cattle for food. The ranchers armed themselves and violence between the Native Americans and whites escalated; this became known as the Owens Valley Indian War (1861-1865). The ranchers asked for help from the military in Los Angeles, Fort Tejon, and Camp Independence. More than 900 Paiute were escorted to San Sebastian Indian Reservation in 1863 (California State Military Museum 2013b).

The presence of the military in the California Desert Region increased dramatically in the years immediately before and after America entered World War II. Fort Irwin, originally established as the Mojave Anti-Aircraft Range, opened in 1940. In 1942 the range was renamed Camp Irwin, in honor of Major General George LeRoy Irwin (California State Military Museum 2011e). It was deactivated in 1944 and reactivated in 1951 as Camp Irwin Armored Combat Training Area for troops destined for the Korean conflict (California State Military Museum 2011e). The first antenna to support the National Aeronautics and Space Administration's unnamed exploration of deep space, called Pioneer Deep Space Station, was constructed near the Goldstone Dry Lake, within Camp Irwin, in 1958 (Norwood 2008). Renamed Fort Irwin again 1961, it was declared a permanent installation. Deactivated again in 1971, it was reactivated in 1980 as the National Training Center and serves as a major training facility for the Army, Marine Corps, and National Guard (California State Military Museum 2011e). The Pioneer Deep Space Station National Historic Landmark is located within Fort Irwin and is on the National Register (#85002813).

Edwards Air Force Base, located north and east of Lancaster, was established in 1942 on land first purchased in 1933 for use as a bombing range of units stationed at March Air Force Base (Mikesell 2000). The facility was from inception used for testing of highly secret developmental aircraft (Mikesell 2000). Rogers Dry Lake is located within the base and its natural attributes of clean air, isolated location, weather, variable terrain, and large expanse was ideal for the military to flight-test aircraft. The base emerged during the Cold War as a premier Air Force high-technology complex, especially important in the areas of experimental flight testing, captive flight testing (test tracks), rocket propulsion research, and, in the 1960s, a center for astronaut training (California State Military Museum 2011d). Edwards Air Force Base continues to be a major testing facility of new and experimental aircraft. In 1985 Rogers Dry Lake was added as a National Historic Landmark and is now listed on the NRHP (# 85002816). It is also a National Historic Site and part of the National Park System.

In February 1942, the Army Ground Forces command determined a training facility was necessary for troops expected to fight in North Africa. Command was given to General George S. Patton, who flew to Riverside in March 1942 and reconnoitered the proposed location (Lynch et al. 1982). He set up a command center close to Desert Center, approximately 20 miles east of Indio, and troops began arriving in early April. The training area, initially named the Desert Training Center, was renamed the California-Arizona Maneuver Area (C-AMA) in 1943 after the fighting in North Africa ended and troops destined for other theaters of operations trained at the facility (Lynch et al. 1982). The C-AMA ultimately included an area approximately 350 miles east–west by 250 miles north–south. The C-AMA stretched from Pomona, California, on its westernmost end almost to

Phoenix, Arizona, on the east, and from Yuma at its south end to Boulder City, Nevada, on its north (Bischoff 2009; Lynch et al. 1982). The main maneuver areas were located in the eastern half of the C-AMA, east of a line running north from Niland, through Desert Center, and up to Kelso and Nipton. Eleven camps were set up, consisting mostly of temporary buildings and tents to house the troops. Seven of the camps were in California: Camp Young (headquarters), Camp Pilot Knob, Camp Coxcomb, Camp Granite, Camp Iron Mountain, Camp Essex, and Camp Ibis. The C-AMA finally closed in mid-1944, by which time approximately 1 million troops had received their advanced training at the facility (Bischoff 2009; Lynch et al. 1982).

In addition to the military camps and bases, the Manzanar Relocation Center was established in 1942 as one of the ten camps where more than 110,000 Japanese Americans were incarcerated during WWII. These were one-story barracks with common bathrooms, showers, laundries, and mess halls for 10,000 people. It was closed in 1945 at the end of WWII; it is the best-preserved internment camp (Thompson 1984). The Manzanar Relocation Center is listed on the NRHP (#76000484) and is designated a National Historic Landmark (#850) and a National Historic Site (N432).

Associated with the C-AMA, the Blythe Army Air Field was established in June 1942 when the Army leased the existing Blythe airport facilities at about 290 acres. Blythe Army Air Field was an Army Air Forces heavy bombardment crew training facility that was enlarged to 2,354 acres between 1942 and 1944. The Army constructed more than 650 buildings at the facility during its operations, including buildings, runways, ammunition storage bunkers, and water and sewer facilities. After the war, the air field was returned to the City of Blythe and the vast majority of the structures was demolished. The airport is still using the main runways and a few buildings (California State Military Museum 2011f).

The Marine Corps Air Ground Combat Center (MCAGCC), Twentynine Palms, first opened in 1940 as an Army glider training area (California State Military Museum 2011[g). Converted to an Army fighter pilot training and bombing range in 1943, it was decommissioned and the land transferred to the County of San Bernardino in 1945. In 1952, the Marine Corps took control of the property and named it Headquarters Marine Corps Training Center, Twentynine Palms, California. It became the MCAGCC, Twentynine Palms in 1979. At approximately 932 square miles, it is the largest Marine Corps Base in existence (California State Military Museum 2011g).

The Marine Corps Logistics Base, Barstow, opened in the summer of 1942 as Navy Supply Depot, Barstow, but was transferred to the Marine Corps as it was being completed in December of the same year. The logistics base supplied material needed for the Fleet Marine Forces in the Pacific Theater during World War II. The base also saw significant expansion during the Korean War years, and has continued to expand its services to the

Marine Corps in the subsequent decades (California State Military Museum 2013c). Because it employs a large number of civilian workers, the growth of the base has also resulted in the growth of the nearby town of Barstow.

China Lake Naval Weapons Center (CLNWC), originally called Naval Ordinance Test Station Inyokern, was established in 1943 for the California Institute of Technology to conduct research into rockets and rocket propellants (Mikesell 2000). CLNWC continued after World War II with development and testing of guided missiles, jet aircraft ejection systems, and later space program capsules and the intercontinental ballistic missile development program (Mikesell 2000). CLNCW is the Navy's largest single land holding at 19,600 square miles and continues as its center for research, testing, and evaluation of weapons systems. The Coso Rock Art District National Historic Landmark is within the boundaries of CLNWC and is on the National Register (#66000209).

In 1964 the Mojave Desert was again the site of a large military exercise, named "Desert Strike." Concentrated west of Needles, approximately 89,000 troops participated (Nystrom 2003). Exercises included amphibious landings on the banks of the Colorado River, construction of gun and other emplacements, and movement of heavy equipment across the desert. This exercise, as in the case of the maneuvers conducted in the C-AMA during World War II, left substantial permanent scars on the desert landscape, including vehicle tracks, remnants of emplacements, and military debris and trash scattered across the landscape (Nystrom 2003).

III.8.3 Known Cultural Resources

To describe the cultural resources within the LUPA Decision Area on a programmatic level, various sources were examined to gather information regarding the known cultural resources within the California Desert Region. Sources included the CDCA Plan and Plan Amendment Resource Management Plans (West Mojave Desert [WEMO], Northern and Eastern Mojave Desert [NEMO], Western Colorado Desert [WECO], Northern and Eastern Colorado Desert [NECO]), Bishop Resource Management Plan (RMP), Bakersfield Proposed RMP/FEIS, Eastern San Diego County RMP, Imperial Sand Dunes Recreation Area Management Plan, the NRHP, the on-line list of California Historical Resources that have been heard by the State Historical Resources Commission, and the BLM Cultural Resources Geodatabase.

The on-line list of California Historical Resources is organized by county and includes California Historical Landmarks (CHLs), California Points of Historical Interest (POHI), and a noncomprehensive list of historical resources from the CRHR or historic properties from the NRHP (http://ohp.parks.ca.gov/listedresources/). This information covers both federal and nonfederal land. It includes only a small portion of the resources that may actually be

present. Nonetheless, these resources are presented as examples of the kinds of resources that are present in the LUPA Decision Area and that can be expected to be present in areas where survey has not yet taken place. A full record search for the entire LUPA Decision Area was not conducted because the resource data is housed in five different CHRIS Information Centers with different database systems. It was not feasible to produce a record search of millions of acres using the CHRIS. Volume IV, Chapter IV.08, and Appendix R2.8 present estimates of the number of resources that may be present in the DRECP area. Estimates for the LUPA Decision Area were not generated.

The publically available portions of the NRHP and CRHR were used to identify and quantify significant historic properties and historical resources within the DRECP area. The following sections present a description of the cultural resources that have been identified within the DRECP area. It is important to note that large portions of the LUPA Decision Area and DRECP area remain unsurveyed and that identification, evaluation, and treatment of cultural resources would need to be conducted on a project-specific level to ensure proper compliance with cultural resources regulations.

III.8.3.1 CDCA Surveys and ACECs

The LUPA Decision Area includes an extensive cultural resources dataset for the CDCA. The CDCA Plan provides management for approximately 25 million acres in Imperial, Kern, Los Angeles, Mono, Riverside, San Diego, and San Bernardino counties. Approximately 96% of the DRECP area is contained within the CDCA (21,769,195 acres). The planning phase of the CDCA Plan included a systematic cultural resource inventory of approximately 179,200 acres between 1969 and 1981 (BLM 1980). These studies are listed in Table R1.8-1. These inventories included stratified random sample surveys and intensive purposive surveys focused on locating specific sites and/or hypothesis testing and met or exceeded the professional standards of the day. Together, these inventories form the baseline of cultural resources data within the CDCA Plan area.

As an effort to preserve cultural resources, the CDCA Plan lists Areas of Critical Environmental Concern (ACECs). An ACEC is an area "within the public lands where special management attention is required ...to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes" (FLPMA 103a). BLM regulations for implementing Federal Land Policy and Management Act ACEC provisions are at 43 CFR 1610.7-2(b). The ACECs within the DRECP area that were designated for their cultural resources values are presented in Table III.8-1. These "values" have one or more of the following properties: (1) they have significant qualities that go beyond local importance and give special worth, consequence, meaning, distinctiveness, or cause for concern, especially compared to any similar resource; (2) they have properties that make them particularly fragile, rare,

irreplaceable, or vulnerable to adverse change; (3) they have been identified as needing protection to satisfy national priority concerns or comply with FLPMA; (4) they have qualities that warrant highlighting to satisfy public or management concerns about safety and public welfare; and/or (5) they pose a significant threat to human life and safety or to property (BLM Guidance Manual 1613).

Each ACEC within the CDCA has its own management plan with specific protection goals and descriptions of the cultural resources within its boundaries. There are 43 cultural resources ACECs within the DRECP area. These have been designated for prehistoric resources, historic-era resources, for Native American values, or for combinations of these values.

Table III.8-1
Cultural Resources ACECs Within the DRECP Area

Ecoregion Subarea	ACEC	Designated Management Values
Cadiz Valley and Chocolate Mountains	Alligator Rock	archaeological values
	Corn Springs	prehistoric and historic values
	Mule Mountains	prehistoric values
	Palen Dry Lake	prehistoric values
	Patton's Iron Mountain Divisional Camp	historic military camp
	Whipple Mountains	Native American values
Imperial Borrego Valley	East Mesa	prehistoric values
	Indian Pass	prehistoric values
	Lake Cahuilla A (#2)	prehistoric values
	Lake Cahuilla B (#3)	prehistoric values
	Lake Cahuilla C (#5)	prehistoric values
	Lake Cahuilla D (#6)	prehistoric values
	Pilot Knob	prehistoric and Native American values
	Plank Road	unique historic road
	San Sebastian Marsh/ San Felipe Creek	prehistoric, historic, and Native American values
	West Mesa	cultural values
	Yuha Basin	prehistoric and historic values
	Singer Geoglyphs	prehistoric values
Kingston and Funeral Mountains	Clark Mountain	prehistoric and historic values
	Halloran Wash	prehistoric values
	Mesquite Lake	prehistoric values
	Mountains Pass Dinosaur Trackway	historic and paleontological values

Table III.8-1
Cultural Resources ACECs Within the DRECP Area

Ecoregion Subarea	ACEC	Designated Management Values
Mojave and Silurian Valley	Calico Early Man Site	prehistoric human occupation
	Christmas Canyon	prehistoric values
	Cronese Basin	cultural resources
	Denning Springs	prehistoric and historic values
	Mesquite Hills/Crucero	prehistoric values
	Salt Creek Hills	prehistoric values
	Bedrock Spring	prehistoric values
	Steam Well	prehistoric and historic values
	Squaw Spring	prehistoric and historic values
Owens River Valley	Fossil Falls	prehistoric values
	Rose Spring	prehistoric values
Panamint Death Valley/ West Mojave and Eastern Slopes	Last Chance Canyon	prehistoric and historic values
Pinto Lucerne Valley and Eastern Slopes	Juniper Flats	prehistoric occupation, historic mining
	Rodman Mountain Cultural Area	cultural values
	Whitewater Canyon	Native American values
	Dead Mountains	Native American values
	Mopah Spring	cultural resources
West Mojave and Eastern Slopes	Black Mountain	prehistoric and Native American values
	Horse Canyon	Prehistoric and ethnographic and contemporary Native American traditional cultural values
	Jawbone/Butterbredt	Native American values
	Rainbow Basin/Owl Canyon	prehistoric values

As noted above, during the planning for the CDCA, there were a number of cultural resources investigations designed to identify where cultural resource sensitivity was higher, to identify they types of resources present, and the ethnographic and historic-era contexts for the region. Recommendations for the protection of cultural resources, including installation of fencing, signage, and road closures, were also a part of these studies. These investigations, their coverage, results, and culturally sensitive areas are detailed in Table R1.8-1 (in Appendix R1). Of the 10 investigations, 5 included surveys covering a total of approximately 37,080 acres. The cultural resource types identified a wide range of cultural resources including habitation sites, temporary camps, rock shelters, caves, milling stations, lithic

scatters, chipping circles, quarries, ceramic scatters, cemeteries, cremation features, rock alignments, geoglyphs, petroglyphs, pictographs, trails, roasting pits, cairns, isolated artifacts, mines, homesteads, historic-era campsites, and historic-era debris concentrations.

As of January 1, 1980, 14,229 cultural resources had been recorded in the CDCA. For the CDCA Plan, a representative sample of 2,903 of those cultural resources were categorized by site type and period. The site types included villages, temporary camps, shelter/cave, milling station, lithic scatter, quarry site, pottery locus, cemetery, cremation locus, intaglio/geoglyph, rock alignment, petroglyph, pictograph, trail, roasting pit, isolated find, cairn, historic, other, and multiple (Table III.8-2). For definitions for these site types, see the Final Environmental Impact Statement and Proposed Plan: Appendix Volume D, for the CDCA (BLM 1980). Categorized by period, 84.3% of the 2,903 sampled cultural resources were prehistoric sites (n=2,447), 11% were historic-era resources (n=319), 3% contained both historic and prehistoric components (n=88), and 1.7% were categorized as other (n=49), with no assigned time period. It should be noted that the lower incidence of historic-era resources was due to the fact that during the time surveys were being conducted for the CDCA (late 1970s through 1981), historical archaeology was in its infancy in the western United States and California and, more importantly, only resources that were clearly the result of activities only up until 1930 were considered. Additionally, the number of TCPs and sacred sites is likely under-represented because the regulations and guidance documents for these types of resources, NPS Bulletin 38 and Executive Order 13007 respectively, did not appear until the late 1980s and 1990s.

Table III.8-2 presents the results of the cultural resources sample analysis, including number of resources within each types and the likelihood of a particular resource in each type being eligible for nomination to the NRHP or CRHR.

Table III.8-2
Sample of Sites From the CDCA Plan

Resource Types in CDCA Plan	# of Resources	Time Period	Eligibility
Village	27	Prehistoric	Eligible
Temporary camp	426	Prehistoric	Possibly
Shelter/cave	163	Prehistoric	Possibly
Milling station	262	Prehistoric	Possibly
Lithic scatter	689	Prehistoric	Possibly
Quarry site	30	Prehistoric	Possibly
Pottery locus	67	Prehistoric	Possibly
Cemetery	0	Prehistoric	Eligible
Cremation locus	2	Prehistoric	Eligible
Intaglio/geoglyph	1	Prehistoric	Eligible

Table III.8-2
Sample of Sites From the CDCA Plan

Resource Types in CDCA Plan	# of Resources	Time Period	Eligibility
Rock alignment	11	Prehistoric	Possibly
Petroglyph	57	Prehistoric	Eligible
Pictograph	0	Prehistoric	Eligible
Trail	41	Prehistoric	Possibly
Roasting pit	342	Prehistoric	Possibly
Isolated find	311	Prehistoric	Not eligible
Cairn	18	Prehistoric	Unknown
Historic-era	319	Historic	Possibly
Other	49	Unknown	Unknown
Multicomponent	88	Both	Possibly
Total	**2903**		

CDCA Plan Amendments

The West Mojave Desert CDCA Plan Amendment (WEMO), the Northern and Eastern Mojave Desert CDCA Plan Amendment (NEMO), and the Western Colorado Desert CDCA Plan Amendment (NECO), and WECO Resource Management Plans (RMPs) were all amendments to the CDCA Plan. These plans contain more specific management direction for areas within the CDCA and add to the overall cultural resources data. For more explanations of these plans, see Volume II, Section II.2.2, No Action Alternative.

The WEMO RMP provides management for 3.3 million acres of public lands in Inyo, Kern, Los Angeles, and San Bernardino counties. There are 29 ACECs within the WEMO plan area, 17 of which are significant for their cultural resources values. These ACECs include Rose Spring, Fossil Falls, Last Chance Canyon, Jawbone-Butterbredt, Christmas Canyon, Bedrock Spring, Steam Well, Red Mountain Spring, Afton Canyon, Calico Early Man Site, Black Mountain, Cronese Lakes, Denning Spring, Juniper Flats, Rodman Mountains, Rainbow Basin, and Salt Creek Hills. In addition to these areas, the RMP lists potentially significant areas: (1) the area around Owens Lake, Haiwee Reservoir, Rose Valley, Cactus Flat, and McCloud Flat down to Fossil Falls–Little Lake; (2) canyons on the east side of Sierra Nevada; (3) El Paso Mountains; (4) the area around Searles Lake; and (5) Lava Mountains.

The NEMO RMP provides management for 2.7 million acres of public lands within Inyo, Mono, and San Bernardino counties. Of the 15 ACECs within NEMO, 10 are within the DRECP area, 8 of which are designated for their cultural, prehistoric, historical, or Native American values:

Clark Mountain, Dead Mountains, Denning Spring, Halloran Wash, Mesquite Hills/Crucero, Mesquite Lake, Mount Dinosaur Trackway, and Salt Creek (Dumont).

The WECO RMP provides management for 475,000 acres and 2,300 miles of off-highway vehicle (OHV) routes in Imperial and San Diego counties. The purpose of the plan was to designate routes as open, limited, or closed to support recreational and general access while conserving cultural and natural resources. Eight ACECs are within the WECO plan area and are designated for their cultural resources: San Sebastian Marsh/San Felipe Creek, Yuha Basin, East Mesa, West Mesa, and Lake Cahuilla #2, #3, #5, and #6. A total of 4,250 archaeological sites was recorded within the WECO plan area during the CDCA amendment period. The majority are associated with prehistoric Lake Cahuilla within the Yuha Desert. The Southwest Lake Cahuilla Recessional Shoreline Archaeological District encompasses 2,700 acres, and is composed of a series of prehistoric resources that follow the shoreline (paleoshores) as the lake receded. Prehistoric resource types along Lake Cahuilla include seasonal camps, ceramic and lithic scatters, rock alignments, geoglyphs (intaglios), pecked rock figures (petroglyphs), pedestrian trail segments, fish traps, and cremations. The main cultural resource type identified within the Yuha Desert are lithic scatters. These show that all phases of stone tool production (material assay, reduction, detailed shaping). Large geoglyphs and round features called "dance circles" are present along the edge of the Yuha Desert. Campsites containing hearths, evidence of small brush structures and pit houses, pottery sherd scatters, stone tool manufacturing debris, milling tools, cleared sleeping circles, and food debris (fresh and saltwater shell fragments and fish and bird bones) are located along Pinto Wash and the paleoshores of Lake Cahuilla. Additional resource types include rock alignments, trail segments, petroglyphs, fish traps, and cremations.

The NECO RMP provides management for 3.8 million acres in the northern and eastern Colorado Desert within Imperial, Riverside, and San Bernardino counties. The main purpose of the plan was to create specific management prescriptions for species and habitats on federal lands, in particular for the desert tortoise. There are 17 ACECs within the NECO area 10 of which are valued in part for their cultural resources. Survey coverage is approximately 3.9% (220,000 acres) of the 5,547,000-acre NECO plan area. As of the year 2000, there have been over 3,700 historic-era and prehistoric resources recorded.

The Bishop RMP provides management for 750,000 acres of public lands in the eastern Sierra Nevada region of Mono and Inyo counties. Only a small portion of this RMP is in the DRECP area. It contains six ACECs, none of which are in the DRECP area.

The Bakersfield RMP provides management for 13.8 million acres in portions of Kern, Kings, San Luis Obispo, Santa Barbara, Tulare, and Ventura counties. Of the 14 ACECs within the Bakersfield RMP, only one, Horse Canyon, is within the DRECP area. Horse

Canyon is associated with important prehistoric, ethnohistoric, and contemporary Native American traditional cultural values.

The Eastern San Diego County RMP provides management for approximately 100,000 acres of public lands in a transitional zone between the California Peninsular Range and the Colorado Desert. Only a portion of this area is within the DRECP and neither of the two ACECs are within the DRECP.

The Imperial Sand Dunes Draft Recreation Area Management Plan provides management for 160,000 acres in Imperial County. There are three ACECs within the DRECP area, two of which are designated for their cultural resources significance: East Mesa and Plank Road.

III.8.3.2 Surveys Unrelated to the CDCA Planning Phase

Since completion of the CDCA Plan in 1980, additional surveys and research studies have been completed within the DRECP area on BLM-managed land as well as on nonfederal lands. Large-scale surveys, including those for China Lake Naval Weapons Center (125,000 acres), Edwards Air Force Base (150,000 acres), Fort Irwin (220,000 acres), Twentynine Palms Marine Corps Center (150,000 acres), and BLM (2,500,00 acres), inventoried an approximate total of 3,145,000 acres and recorded over 20,000 prehistoric resources. These studies, while in areas not affected by the DRECP or the Proposed LUPA, provide key information about the kinds of cultural resources present in the region. All site types, from large habitations, camps and quarries, to shelters, have been identified ranging from the early Holocene to the late Holocene (Sutton et al. 2007). In addition, 200 sites have been recorded since the 1970s at the Chocolate Mountains Aerial Gunnery Range. Common site types include lithic scatters and flaking stations, rock rings and cleared circles, and trail segments. At the Marine Corps Logistics Base Barstow, more than 50 archaeological sites have been recorded, including rock art, cleared circles, and trail segment site types (USMC Cultural Resources Program Guide 2009).

Surveys conducted for large-scale alternative energy projects have also contributed to the overall knowledge concerning cultural resources of the region. Examples of these larger projects include Desert Sunlight Solar Farm, Alta Wind (I-VI and VIII), Centinela Solar, Genesis NextEra, Alta East Wind, North Sky River Energy, Ivanpah Solar Electric Generating System, Ocotillo Express Wind, Imperial Solar Energy Center South, and NextLight Antelope Valley (AV Solar Ranch) PV1. For a complete listing of projects that are under construction and or operational, see Appendix O. These include 5 BLM projects and 47 projects on private or other public lands. Some of these survey areas and cultural resources have not been included in the BLM Cultural Resources Geodatabase (described in Section III.8.3.3), because GIS data was not readily available.

III.8.3.3 BLM Cultural Resources Geodatabase

The characterization of known cultural resources within the DRECP area also included consulting the BLM Cultural Resources Geodatabase (CRG). This database was compiled from: (1) seven BLM field office geodatabases within the LUPA Decision Area (Needles, Barstow, and parts of Palm Springs, El Centro, Bakersfield, Bishop, and Ridgecrest); (2) the BLM GIS 2004 Legacy data; (3) the South Coastal Information Center Mapping for Eastern San Diego County; (4) the West Mojave Plan Court Remedy records review mapping; (5) mapping associated with renewable energy projects; and (6) the State Historic Resource Information Mapping Project. The CRG includes data from the surveys described in Sections III.8.3.1 and III.8.3.2. The data compiled through March 2013 contains cultural resource locations and survey information, but the data sets have varying degrees of completeness. For example, some cultural resource entries include their period of occupation, site attributes, and NRHP eligibility while other cultural resource entries only consist of a numerical identification. CRHR eligibility was not part of the site attributes of the CRG. The CRG provides geospatial information for resources on lands outside of BLM jurisdictional boundaries. This may include resources found on lands administered by the: Department of Defense, United States Forest Service, National Park Service, Bureau of Reclamation, United States Fish and Wildlife Service, Bureau of Indian Affairs, State of California, and city and county government entities. Resources located on private lands are also included in this database. The attributes for the survey data are limited so that the surveyed acres reflect only those associated with BLM inventories. Some of the recent large renewable energy projects have not been included in the dataset. Additional research, records search, field survey and documentation, and Native American consultation need to be conducted at the regional and project specific levels to aid in filling in these data gaps.

Based on the CRG, there have been at least 1,069 surveys or investigations in the DRECP area that together identified 36,262 cultural resources. These numbers were tabulated using the Cultural Resources GIS geodatabase resource points, resource polygons, resource lines, and survey polygons. This database is the most comprehensive digital data available at the time of this writing. Before tabulation, the resource points and resource lines were converted into polygons with a 15-meter buffer to consolidate the data into one usable dataset. Multiple lines and/or multiple polygons with the same primary number in the same ecoregion subarea were counted only once. If a cultural resource fell in more than one ecoregion subarea, it was counted one time in each ecoregion subarea within which it fell.

Prior to tabulating the number of surveys and acre coverage, raw data from the CRG was compiled and subjected to quality control measures. Large polygons that matched the geometry of U.S. Geological Survey map quadrangles or those polygons that were more than 10,000 acres and shared a boundary with a quadrangle were assumed to be data errors (not actual surveyed areas) and were omitted from the analysis. The point and line

data set could not be used to calculate acres. The number of surveys was tabulated using the survey polygon, point, and line datasets while the number of acres surveyed was tabulated using only the survey polygon dataset. Approximately 1,625,500 acres are known to have been surveyed within the DRECP area. This represents 7.2% of the total DRECP area. Figure III.8-3 displays the percentage of previously surveyed land by ecoregion subarea, with the ecoregion subarea with most surveyed acres identified in red, and the ecoregion subarea with the least surveyed acres identified in blue.

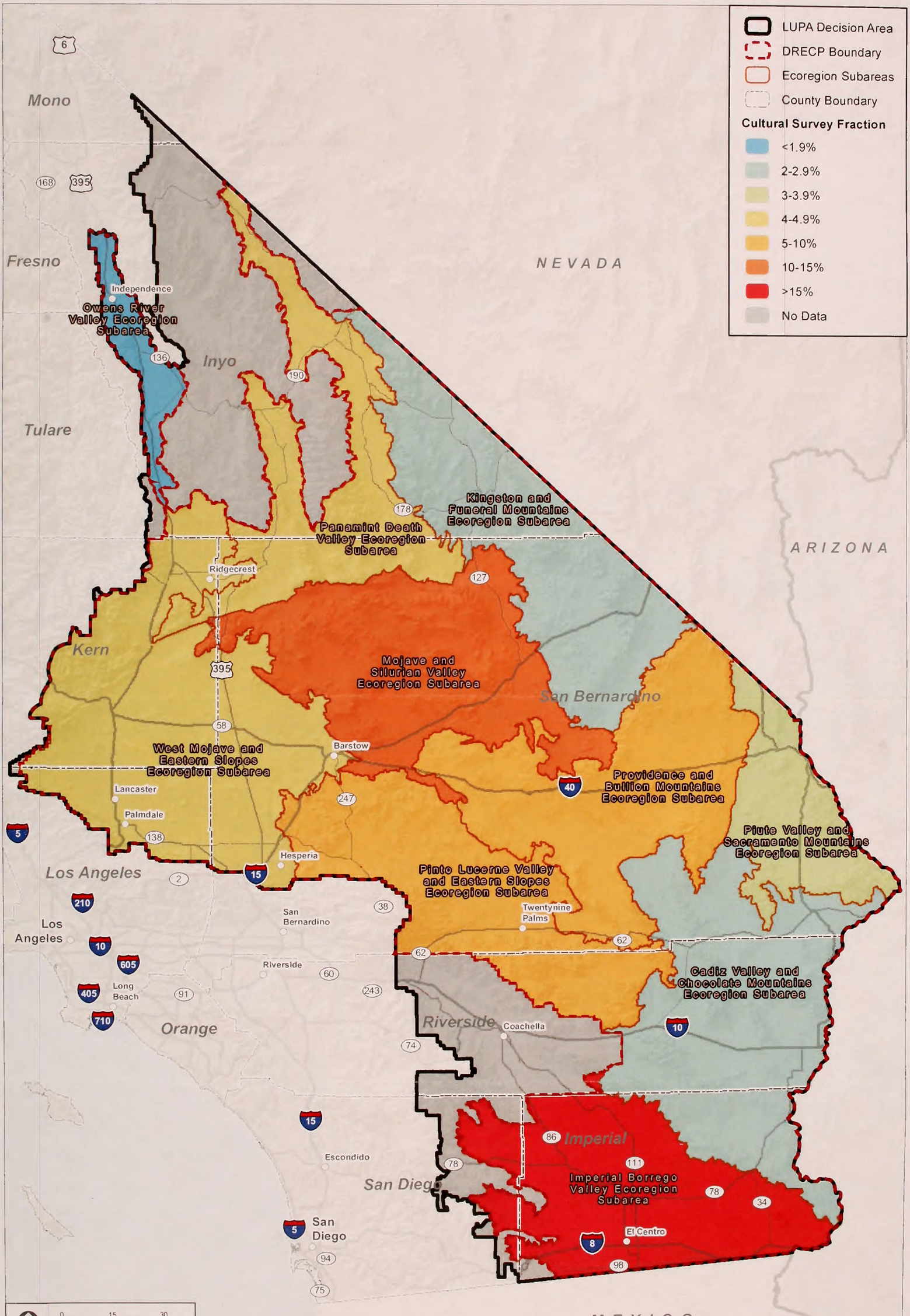
The total number of acres of land surveyed and the total number of resources identified during those surveys were used to calculate an average cultural resource density for each ecoregion subarea and for the DRECP area as a whole. These density estimates are applicable to all lands in the DRECP area regardless of land ownership.

III.8.3.4 Results of Cultural Resources Analysis

The information produced through analysis of known surveys shows that the number of cultural resources is very high in the DRECP area. On top of this, calculations of the density of cultural resources show that a very large number of cultural resources remain unidentified. Additional cultural resources will be identified when more of the DRECP area is surveyed on a project-by-project basis as required by the Conservation and Management Actions defined in Volume IV, Chapter IV.8. Both prehistoric and historic-era sites are present, representing a wide range of resource types. Cultural resources, their densities, and eligibility are discussed first, followed by National Historic Trails. This separation is due to the particular issues surrounding long linear features and the specific legal context used for the National Historic Trails, as well as data availability.

Cultural Resources

Table R1.8-2 (in Appendix R1) displays the number of previously identified cultural resources by DRECP ecoregion subarea, the resource type, and NRHP eligibility status. In addition, the percentage of surveyed acreage and the density of cultural resource per acre were calculated by DRECP ecoregion subarea. Cultural resource densities were calculated from the number of known cultural resources (the historic, prehistoric, multicomponent sites with both prehistoric and historic, and unknown types minus isolated artifacts) divided by the number of acres surveyed within each DRECP ecoregion subarea.



Sources: ESRI (2014), BLM (2015), RECON (2014)

FIGURE III.8-3

Surveyed Acres by DRECP Ecoregion Subarea

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Table III.8-3 indicates the number of previously identified cultural resources in the LUPA Decision Area. These numbers are significantly smaller since they do not include private, state, and other kinds of federal land.

Table III.8-3
Previously Identified Cultural Resources in the LUPA Decision Area (All DRECP ecoregion Subareas)

NR Status	Prehistoric	Historic	Multi-Component	Unknown Type	Isolate	Total
Unknown Status	623	819	124	12,507	0	14,073
Not Evaluated	945	480	122	3	0	1,550
Ineligible	40	95	9	0	1,776	1,920
Eligible	274	56	29	13	0	372
Listed	7	0	0	0	0	7
Total	**1,889**	**1,450**	**284**	**12,523**	**1,776**	**17,922**

As noted above, because only a fraction (7.2%) of the DRECP area has been surveyed, the actual number of cultural resources is highly underrepresented. Approximately half of the alternative energy projects that are under construction or in operational status (such as Alta East Wind, NextLight Antelope Valley PV2, and North Sky River Energy) occur within the West Mohave and Eastern Slopes DRECP ecoregion subarea where the cultural resource density is 0.04 cultural resources per acre (see Appendix O for more details on projects under construction or in operational status). This number is at the higher range when compared to other DRECP ecoregion subarea cultural resources densities. The Owens River Valley DRECP ecoregion subarea, with only a single in-construction or operational renewable energy project (a wind project located within the Naval Air Weapons Station China Lake), has the highest cultural resources density at 1.76 cultural resources per acre.

During the permitting of future projects, cultural resources surveys would be completed on a project-by-project basis pursuant to applicable regulations including the Section 106 process of the NHPA as implemented in 36 CFR 800, NEPA 42 U.S.C. 4321 et seq. As indicated in Table III.8-3, the majority of known cultural resources have not been evaluated for eligibility on the NRHP or have an unknown eligibility status. An alternative for planning purposes would be to consider all cultural resources eligible for listing on the NRHP, with the exception of isolated finds.

Of the cultural resources within the DRECP area, a number are determined eligible or listed on the NRHP and/or CRHR, or have been designated California Historical Landmarks or POHIs. These terms are defined in more detail in Section III.8.2. Table R1.8-3 (see

Appendix R1) lists the name of the resource and its designation. There are 66 cultural resources on the NRHP, 2 cultural resources on the CRHR, 54 California Historical Landmarks, and 46 Points of Historical Interest within the DRECP area. Since these are the only publically available portions of the registers, they are not complete and do not provide geospatial information, so it was not possible to differentiate the data between federal and nonfederal lands.

San Bernardino County contains the highest number of listed resources. Table R1.8-3 (in Appendix R1) includes linear resources that may cross multiple DRECP ecoregion subareas. Examples of historically significant linear resources include the Mojave Road, Plank Road, Eichbaum Toll Road, National Old Trails Monument, and Fages–De Anza Trail–Southern Emigrant Road. National Historic Trails are discussed in further detail below.

It is important to note that these numbers do not include prehistoric and historic resources that have been recommended as eligible but have not been nominated to the NRHP or CRHR, nor do they include consensus determinations that result in resources being automatically placed on the CRHR. The number of prehistoric and historic resources that should be treated as significant is therefore much higher. For example, according to the WECO RMP, the All-American Canal, Coachella Canal, East Highline Canal, and Southern Pacific Railroad line have been determined to be eligible for listing on the NRHP; however, they are not currently on the list. In addition, 139 prehistoric and 9 historic-era resources have been evaluated through the Section 106 process and determined eligible or potentially eligible for listing on the NRHP (WECO RMP). When more of the DRECP area is surveyed on a project-by-project basis as a requirement for future projects, and additional CHRIS records searches are conducted, the number of significant cultural resources will increase. Cultural resources that have not yet been formally evaluated for their eligibility to the NRHP and CRHR are considered eligible for listing, with the exception of cultural isolated finds. Any adverse impacts to these cultural resources will need to be resolved under Section 106.

Historic Trails

National Historic Trails with alignments within the LUPA Decision Area include the Pacific Crest Trail, the Juan Bautista de Anza National Historic Trail, and the Old Spanish National Historic Trail. These trails are administered by the NPS, while segments of the trails located on public lands are managed by BLM. As of the writing of this document, the NPS is considering designating the Butterfield Overland Trail as a National Historic Trail. The Pacific Crest National Scenic Trail runs from Mexico to Canada, a distance of 2,650 miles. It is administered by the U.S. Forest Service in partnership with BLM, NPS, California State Parks, and the Pacific Crest Trail Association. The Pacific Trail Comprehensive Management Plan was published in 1982 to provide overall guidance, direction, and strategy for

management of the trail, its use, and its significant resources. Approximately 114 miles of this trail pass through the LUPA Decision Area in the Pinto and Lucerne Valley DRECP ecoregion subarea (11 miles) and in the West Mojave and Eastern Slopes ecoregion subarea (103 miles). In 1932, Clinton C. Clarke, known as the father of the Pacific Crest Trail System, organized the Pacific Crest Trail System Conference with the vision that existing trails would be interconnected with new segments of trail and extend from Canada to Mexico. Points along this scenic trail provide views east to various portions of the LUPA Decision Area (U.S. Department of Agriculture 1982). This trail is not listed on the NRHP.

The National Park Service, with support of community groups along the trail corridor, completed the feasibility study of the Juan Bautista de Anza National Historic Trail in 1986, determining that it met the criteria of the National Trails System Act. With continued support from the broader public, Congress designated the trail a component of the National Trails System in August 1990. In 1996, the National Park Service, the designated federal administrator for the implementation and interpretation of the Anza Trail, completed the Comprehensive Management and Use Plan/Final Environmental Impact Statement (CMP/FEIS) responding to congressional designation of the Juan Bautista de Anza National Historic Trail and the requirements of the National Trail System Act, as amended. The CMP/FEIS defines a vision for the Anza Trail, "a traveler will be able to hike, ride horseback, bicycle, and drive on a marked route ... and experiences landscapes similar to those the expedition saw...".

Approximately 83 miles of the 1,210-mile (from Arizona to California) Juan Bautista de Anza National Historic Trail historic corridor alignment are in the DRECP area, in the Imperial Borrego Valley DRECP ecoregion subarea. The trail commemorates the story of the 1775-1776 Spanish Expedition, whose members traveled this route from Mexico to what is now the San Francisco Bay Area. In some cases, the path taken by the de Anza party is on privately owned lands, on government military bases, or is inaccessible in some other way. The Trail is associated with three components. They are: a historic corridor (the historic path travelled by the expedition), a recreation retracement route (a modern, multiuse continuous and commemorative trail implemented by local land managers and non-profits from Nogales, Arizona to San Francisco, California), and an auto route (a signed auto tour route that parallels the historic corridor on paved highways throughout Arizona and California)(NPS 1996). The CMP/FEIS includes maps of the historic trail corridor, the auto route, high potential segments, and historic sites. While scholarly research and debate of the exact location still continues, the Anza Trail administrative staff maintains online maps of the historic corridor, planned (from regional and local trail plans) and existing recreation trail segments, and historic campsites.

Within the DRECP area, the congressionally-designated historic corridor crosses the Colorado River into California, then drops down into Mexico (avoiding the large expanse of

sand dunes), and then reenters the United States southwest of El Centro. The historic trail corridor continues north through the Yuha Desert, Borrego Valley, Coyote Canyon, Bautista Canyon and into the San Bernardino/Riverside Metropolitan areas. The auto route travels along the southern edge of Imperial County before turning north near El Centro towards Anza-Borrego State Park. Recreation trail segments exist within the BLM Yuma District and the California Desert District as well as through various easements across private lands. While, the historic trail corridor dips into Mexico, the continuous recreation trail is planned to be entirely within the United States through the southern Imperial-Borrego Valley.

Points along this trail offer vistas and panoramic views of the Imperial Valley and Anza-Borrego desert lands. In many areas of the California desert, this landscape has changed very little since the time of the expedition, and its integrity allows visitors the opportunity to vicariously experience that time period. The NRHP-listed Fages–De Anza Trail–Southern Emigrant Road refers to the southern part of this historic trail. The Comprehensive Management and Use Plan for the trail envisions a continuous recreation trail paralleling the route of the historic trail corridor. Large segments of the recreation trail are signed on BLM lands in the Imperial Valley and within the Anza-Borrego Desert State Park. The Trail's historic corridor is part of BLM's National Landscape Conservation System so is federally protected.

Approximately 367 miles of the Old Spanish National Historic Trail are within the LUPA Decision Area and cross six of the DRECP ecoregion subareas (Western Mojave and Eastern Slopes, Mojave and Silurian Valley, Kingston and Funeral Mountains, Providence and Bullion Mountains, Pinto Lucerne Valley and Eastern Slopes, and Piute Valley and Sacramento Mountains). In total, this trail is more than 2,700 miles long and crosses New Mexico, Colorado, Arizona, Utah, Nevada, and California. The various route alignments of this historic trail network are a combination of indigenous people's paths, horse and mule exploration, and trade routes used to transport merchandise and people in the early 1800s. Mexican trader Antonio Armijo is said to have led the first commercial caravan from Abiquiú, New Mexico, to Los Angeles late in 1829. By 1848, at the end of the Mexican-American War, the United States had taken control of the Southwest, and with the subsequent Gadsden Purchase, planned a southern route for a transcontinental railroad. After 1848, use of the Old Spanish Trail declined as other routes to California were developed. The Old Spanish National Historic Trail was established in 2002 and is co-administered by the NPS and BLM, but includes all land ownerships. The Old Spanish National Historic Trail is not a constructed contiguous trail with a demarcated alignment, and it has very few officially designated hiking trails along its trail corridor. Although portions of the trail are in private ownership, points along it do have public access, viewpoints, and interpretive sites for visitors. Almost none of Old Spanish National Historic Trail is listed in the Register, and because it is hard to find through a pedestrian survey, it is

not likely to even be recorded and evaluated. Therefore, the designated alignment of the Old Spanish National Historic Trail will be considered and treated as eligible for the NRHP on the basis of its setting and visual characteristics and verified historical significance, unless the particular segment lacks integrity (NPS 2001).

Approximately 64 miles of the Butterfield Overland Trail are within the LUPA Decision Area in the Imperial Borrego Valley DRECP ecoregion subarea. As authorized under the Omnibus Public Lands Management Act (Public Law 111-11), NPS is conducting a special resource study and environmental assessment to evaluate the suitability and feasibility of this trail for designation as a National Historic Trail. The Butterfield Overland Trail was established in 1858 to create a transportation system for mail and passengers from the East Coast to California in 25 days. Butterfield Overland Mail Company ran the service between 1858 and 1861. It was the first regular communication and transportation service across the United States. The route was approximately 2,800 miles between San Francisco and its two eastern limits: St. Louis, Missouri, and Memphis, Tennessee. These two lines joined in Little Rock, Arkansas, and continued through Texas to Fort Yuma near present-day Yuma, Arizona, and ended in San Francisco (Helmich 2008; Norris 2013).

The Old National Trail, subsequently U.S. 66 (Route 66) traverses the desert from Barstow to Topock. The road has been surveyed and evaluated for NRHP eligibility by the National Park Service and portions of the road have been determined eligible for listing in consultation with the SHPO.

The Proposed LUPA Affected Environment includes cultural resources found within BLM-administered lands in the DRECP area. Table III.8-4 indicates the number of cultural resources under the BLM Affected Environment.

Table III.8-4
Cultural Resources of the BLM LUPA Affected Environment (All DRECP Ecoregion Subareas)

NR Status	Prehistoric	Historic	Multi-Component	Unknown Type	Isolate	Total
Unknown Status	623	819	124	12,507	0	14,073
Not Evaluated	945	480	122	3	0	1,550
Ineligible	40	95	9	0	1,776	1,920
Eligible	274	56	29	13	0	372
Listed	7	0	0	0	0	7
Total	**1,889**	**1,450**	**284**	**12,523**	**1,776**	**17,922**

III.8.4 Transmission and Cultural Resources Outside of LUPA Decision Area

The transmission required outside of the LUPA Decision Area would fall into four geographic regions: San Diego, Los Angeles, Central Valley, and North Palm Springs–Riverside. The following section discusses cultural resources in these regions using information gathered from four large transmission projects. Section III.8.1 provides the Regulatory Setting for cultural resources, including federal acts and regulations (National Historic Preservation Act, Archaeological Resources Protection Act, Antiquities Act, Preserve America, and CDCA Plan Cultural Resources Element).

This Affected Environment discussion covers three kinds of cultural resources, classified by their origins: prehistoric, ethnographic, and historic. Prehistoric archaeological resources are associated with the human occupation and use of California before prolonged European contact. In California, the prehistoric period began more than 12,000 years ago and extended through the eighteenth century until 1769, when the first Europeans settled in California. Ethnographic resources represent the heritage of a particular ethnic or cultural group, such as Native Americans or African, European, Latino, or Asian immigrants. Historic-period resources, both archaeological and built-environment, are associated with Euro-American exploration and settlement of an area and the beginning of a written historical record. The following prehistoric, ethnographic, and historical background provides the context for the cultural resources outside of the LUPA Decision Area.

III.8.4.1 San Diego Area

This transmission corridor extends from Ocotillo in Southwestern Imperial County to San Diego and uses the existing Sunrise Powerlink corridor as a proxy for cultural resources.

III.8.4.1.1 Cultural Resources Background and Context

The San Diego area encompasses at least four major environmental provinces: coastal, foothill, mountain, and desert. An understanding of the differences among these four provinces concerning water and subsistence resource availability, and how the relative habitability of these areas changed over time based on climatic and other factors (both environmental and cultural), is essential to deciphering and explaining the specific details of the region's cultural history.

Prehistory

The body of current research of pre-contact occupation in San Diego County and Western Imperial County recognizes the existence of at least two major cultural periods, Early Period/Archaic and Late Period, based upon general economic trends and material culture.

Within the region, the Early Period/Archaic spans from roughly 9500 to 1300 BP, and the Late Period begins approximately 1300 BP and ends with historic contact.

The Early Period/Archaic includes the San Dieguito Complex and regional manifestations of what is generally termed the Archaic Complex, including the coastally oriented La Jolla, the inland valley/foothills Pauma, and the Desert Archaic. These archaeological complexes are still poorly defined, as are the interrelationships between contemporaneous coastal, inland, and desert assemblages. The San Dieguito Complex is typified as a nonspecialized hunting and gathering society.

Early Period/Archaic site types from 9500 to 1300 BP within San Diego County include coastal habitation sites; inland hunting, gathering, and seed milling camps; and quarry sites. Material cultural assemblages during this long period are remarkably similar in many respects. The Archaic period in Western Imperial County is not strongly represented.

In San Diego County, Late Period cultural patterns include the San Luis Rey Complex in Northern San Diego County and the Cuyamaca Complex of the central Peninsular Range. A subsistence pattern is characterized by winter village occupation at lower elevations with a reliance on stored resources and movement to mountain villages for the summer and fall months (California Public Utilities Commission [CPUC] and BLM 2008).

Ethnography

The San Diego area falls mainly within ethnographically recorded Kumeyaay/Diegueño/ Kwaaymii territory and skirts Cupeño/Cahuilla territory. Territorial boundaries are not precisely mapped and may have been fluid. Language families and territories of these groups are presented in Table III.8-5 (CPUC and BLM 2008).

Table III.8-5
Ethnographic Groups in the San Diego Area

Ethnographic Group	Language Family	Territory
Kumeyaay (also referred to as Ipai-Tipai, Northern and Southern Diegueño, or by clan name, such as Kwaaymii)	Yuman	San Diego Coast to Colorado Desert
Cahuilla	Takic	San Bernardino Mountains in the north to Borrego Springs and the Chocolate Mountains in the south, a portion of Colorado Desert west of Orocopia Mountain to the east, and the San Jacinto Plain near Riverside and the eastern slopes of Palomar Mountain to the west
Cupeño	Takic	San Luis Rey River headwaters

History

The San Diego area includes a variety of diverse historic period resources that represent most of the major trends that have affected the development of San Diego and Imperial counties over the past 200 years. The history of the region is generally divided into the Spanish (1769-1821), Mexican (1821-1846), and American (after 1846) periods. The Spanish Period began in July 1769 with the establishment of a mission and presidio on a hill overlooking San Diego Bay. The Mexican Period began in 1821 when Mexico achieved independence from Spain. During the 1820s, a small village began to form at the base of Presidio Hill that became the Pueblo of San Diego (present-day Old Town). In 1846, San Diego was occupied by American troops and officially became part of the United States in 1848 with the Treaty of Guadalupe Hidalgo. The Southern Overland Trail, which often corresponds with the corridor, became the major overland entrance to Southern California before construction of the Southern Pacific Railroad, and in 1857 overland mail service was established along the trail.

The modern City of San Diego was founded in 1867. A land boom in 1870 brought a successful start to the new metropolis, which soon replaced the old pueblo of San Diego as the region's commercial hub. A railroad connection completed in the mid-1880s initiated a second building boom and brought widespread urban development to many areas of San Diego County.

Large-scale mining in San Diego County's backcountry was stimulated by the discovery of gold at Julian in the late 1860s and early 1870s. A number of mines are located within or near the San Diego area and include the Shenandoah, Himalaya, and San Diego mines in Mesa Grande; the Montezuma Mine north of Ranchita; the Grapevine Mine in Grapevine Canyon; and the Elliott Dolomite Mine near Sweeney Pass.

At their peak, between 1900 and 1910, approximately 112 rural farmstead communities existed within the county's present-day boundary. By 1940, however, the number of people living on San Diego County farms was only 2% of the total population. Meanwhile, from 1870 to 1970, livestock ranching continued to thrive in San Diego County, but had to compete with expanding crop agriculture and urbanization (CPUC and BLM 2008).

III.8.4.1.2 Cultural Resources in the San Diego Area

The San Diego area encompasses land under BLM, USFS, California State Parks, Department of Defense (DOD) and tribal jurisdiction. Some areas potentially containing cultural resources include the Yuha Basin ACEC, San Sebastian Marsh ACEC, Anza-Borrego Desert State Park, Cleveland National Forest, and Juan Bautista de Anza National Historic Trail. Tribal land in the corridor is mostly in Eastern San Diego County and includes the Santa Ysabel, Mesa Grande, Barona, and Capitan Grande reservations.

Although the total number of cultural resources in this area is unknown, a rough order of magnitude estimate can be derived based on recent surveys related to the Sunrise Powerlink Project. Table III.8-6 presents information on the types of cultural resources identified during these surveys. Fourteen of these resources are eligible or potentially eligible for the NRHP and the CRHR. Prehistoric site types include lithic and ceramic scatters, bedrock milling stations, temporary camps, habitations, roasting pits, rock features, trails, cremations, and marine shell scatter. Historic site types include refuse scatters, reservoirs/dams, homesteads, buildings, walls, foundations, roads, railroads, transmission lines, and historic addresses (CPUC and BLM 2008).

Table III.8-6
Cultural Resource Types in the San Diego Transmission Corridor Area

Time Period	No. of Resources	Percent	No. of Resources/Acre
Prehistoric	205	85%	0.125
Prehistoric (human remains)	6	2%	0.003
Historic	21	9%	0.013
Multicomponent and Unknown	9	3%	0.005
Total	**241**	**100%**	**0.147**

Based on a survey acreage of 1,644 acres

Tables III.8-7 and III.8-8 show the typical number of cultural resources that could potentially be affected by transmission line corridors and substations.

Table III.8-7
Typical ROW Widths and Linear Impacts of
Bulk Transmission to San Diego Area Cultural Resources

Transmission Line Voltage	Transmission ROW Corridor Width (feet)	Access Road Width (feet)	Potential Extent of Effects/Linear Mile (in Acres)	Potential No. of Resources Affected/ Linear Mile
230 kV				
Double-Circuit Tower Line	100	24	15	2.21
500 kV				
Single-Circuit Tower Line	200	24	27	3.97
Two Single-Circuit Tower Lines	450	24	57	8.38
Three Single-Circuit Tower Lines	700	24	88	12.94
Four Single-Circuit Tower Lines	950	24	118	17.35

Note: Access road width is added to ROW width for total width of linear disturbance.

Table III.8-8
Impacts of Substation Construction to Cultural Resources in the San Diego Area

Substation Type	Size (Acres)	Potential Number of Resources Affected
66 kV Collector Substation	39 acres	5.73
230/66 kV Collector Substation	77 acres	11.32
500/230 kV Collector Substation	176 acres	25.87
500/230/66 kV Super Collector Substation	215 acres	31.61

III.8.4.2 Los Angeles Area

This transmission corridor extends from Palmdale to the Los Angeles Basin, and uses Tehachapi Renewable Transmission Project (TRTP) Segments 6, 7, and 11 as a proxy for cultural resources.

III.8.4.2.1 Cultural Resources Background and Context

The Los Angeles area extends from the western Mojave at the base of the Tehachapi Mountains, south through the Angeles National Forest and into the Los Angeles Basin. It is located within Los Angeles County. The corridor encompasses at least three major environmental provinces: foothill, mountain, and desert.

Prehistory

Scholars have defined a series of cultural traditions and periods for this region beginning at the end of the Pleistocene Epoch (*ca.* 12,000 BP) and running through the Contact Period (*ca.* 300 BP). These periods are often overlapping in duration and regional distribution.

Within the West Mojave Desert region the Terminal Pleistocene/Paleo-Indian Period (12,000 to 10,000 BP) featured increasing post-glacial temperatures and unstable climates. Archaeologists hypothesize that the earliest occupants of the region led a foraging lifestyle focused around lakeshore or wetland environments. As climatic conditions became warmer and more arid during the transition from the late Pleistocene to the early Holocene (10,000 to 7000 BP), human populations responded by focusing their subsistence efforts on a wider variety of faunal and floral resources. It is presumed that the adaptive strategy continued to be one of generalized hunting and gathering focused on the exploitation of wetland resources.

Relatively recent paleoecological and paleohydrological evidence suggests that maximum aridity in the desert regions existed between *ca.* 7000 and 5000 BP. During this period, it is

believed that populations diminished and dispersed due to the decrease in permanent wetland habitats; thus, the Pinto Period reflects a settlement pattern in which the population relocated from the ancient lakeshores to seasonal water sources. As a result of increased precipitation after 5000 BP, modern vegetation and climate conditions were well established by 4300 BP. During the Gypsum Period (4000 to 1500 BP), large village sites appear in the archaeological record.

The Saratoga Springs Period (1500 to 800 BP) is marked by strong regional cultural developments, especially in the Southern California desert area, which was heavily influenced by the Hakataya (Patayan) culture of the lower Colorado River. The Late Period (800 to 300 BP) saw the end of the obsidian trade and an increased use of local cryptocrystalline toolstones. Changes in regional networks of raw material exchange may be associated with a drought episode (*ca.* 850 to 650 BP) and the migration of Numic-speaking populations out of Southeastern California. With the return of wetter conditions around 500 BP, there is some evidence of population increase in Southern California and archaeological evidence indicates that the Late Period populations utilized a greater variety of subsistence resources, including both small and large mammals, and in some areas, fish (CPUC and USFS 2010).

Ethnography

When Europeans arrived in Southern California, the Western Mojave Desert, San Gabriel Mountains, and Eastern Los Angeles Basin were inhabited by at least three distinct cultural groups with the occasional presence of several others. These groups include members of the Kitanemuk, Tataviam, Vanyume, and Gabrielino tribes; their languages and territories are presented in Table III.8-9 (CPUC and USFS 2010).

Table III.8-9
Ethnographic Groups in the Los Angeles Area

Ethnographic Group	Language Family	Territory
Kitanemuk	Takic	Southern foothills of the Tehachapi Mountain
Tataviam	Takic	South side of the Antelope Valley and into the San Gabriel Mountains
Vanyume	Takic	Mojave River area
Gabrielino	Takic	Eastern San Gabriel Mountains and south into the Los Angeles Basin

History

As discussed earlier, the history of the region is generally divided into the Spanish (1769-1821), Mexican (1821-1846), and American (after 1846) periods. During the Spanish period the two missions that most influenced the Los Angeles area are Mission San Gabriel Arcangel (1771) near modern day San Gabriel and Mission San Fernando Rey de España (1797) near the modern-day Mission Hills district of Los Angeles.

The first Europeans to enter the Antelope Valley were Spanish soldiers and missionaries exploring the interior of Alta, California, including Captain Pedro Fages in 1772, Father Francisco Garces in 1776, Jedediah Smith and Kit Carson in the 1820s, and John Fremont in 1844. California's accession to the Union in 1850 led to several developments in the region. In 1854, Fort Tejon was established to protect the major north–south throughway west of the corridor. The Butterfield Stage began service through the Antelope Valley in 1858. A telegraph line between Los Angeles and San Francisco was run through the region in 1860. With construction of the Southern Pacific Railroad through the Antelope Valley in 1876, farming became popular in the area. The towns of Acton, Alpine (Palmdale), Lancaster, and Rosamond were established along the rail line. Ranching declined due to a series of severe droughts in the late 1800s, but the completion of the Los Angeles Aqueduct between the Owens Valley and Los Angeles in 1913 brought increased agriculture and ranching to the area.

Throughout the late eighteenth and nineteenth centuries, the San Gabriel Mountain region was used for a variety of commercial enterprises including lumbering, mining, herding stock, as well as hunting, camping, and other recreation. Beginning in the 1770s, lumber was cut for the construction of the missions and later for the construction of the communities of the Los Angeles Basin. The first gold rush in the San Gabriel Mountains was triggered by Francisco Lopez in 1842. Land in the Eastern Los Angeles Basin was settled throughout the mid-to-late nineteenth century, beginning with El Monte in 1852, at the terminus of the Santa Fe Trail. Other cities followed, including Rosemead, Pasadena, Irwindale, and Baldwin Park (CPUC and USFS 2010).

III.8.4.2.2 Cultural Resources in the Los Angeles Area

Although the total number of cultural resources present in this area is unknown, a rough order of magnitude estimate can be derived based on recent surveys related to TRTP. Table III.8-10 presents information on the types of cultural resources identified during the TRTP surveys. Prehistoric site types include habitation sites, lithic scatters, bedrock milling stations, hunting blinds, trails, quarries, and rock art. Historic-era resources include roads, trails, and refuse scatters. Other historical themes represented in the inventory include electrical transmission, mining, ranching/farming, water distribution, and national defense.

Of the 135 resources, 6 are eligible or potentially eligible for the NRHP and the CRHR (CPUC and USFS 2009, 2010).

Table III.8-10
Cultural Resources Types in the Los Angeles Transmission Corridor Area

Time Period	No. of Resources	Percent	No. of Resources/Acre
Prehistoric	66	48.9%	0.009
Historic	64	47.4%	0.009
Multicomponent	5	3.7%	0.001
Total	**135**	**100%**	**0.019**

Based on surveys of 7,297 acres out of 7,750 acres in the proposed route.

Table III.8-11 and Table III.8-12 show the typical number of cultural resources that could potentially be affected by transmission line corridors and substations.

Table III.8-11
Typical ROW Widths and Linear Impacts of
Bulk Transmission to Los Angeles Area Cultural Resources

Transmission Line Voltage	Transmission ROW Corridor Width (feet)	Access Road Width (feet)	Potential Extent of Effects/ Linear Mile (Acres)	Potential No. of Resources Affected/ Linear Mile
230 kV				
Double-Circuit Tower Line	100	24	15	0.29
500 kV				
Single-Circuit Tower Line	200	24	27	0.52
Two Single-Circuit Tower Lines	450	24	57	1.08
Three Single-Circuit Tower Lines	700	24	88	1.67
Four Single-Circuit Tower Lines	950	24	118	2.24

Note: Access road width is added to ROW width for total width of linear disturbance.

Table III.8-12
Impacts of Substation Construction to Cultural Resources in the Los Angeles Area

Substation Type	Size (Acres)	Potential No. of Resources Affected
66 kV Collector Substation	39 acres	0.74
230/66 kV Collector Substation	77 acres	1.46

Table III.8-12
Impacts of Substation Construction to Cultural Resources in the Los Angeles Area

Substation Type	Size (Acres)	Potential No. of Resources Affected
500/230 kV Collector Substation	176 acres	3.34
500/230/66 kV Super Collector Substation	215 acres	4.09

III.8.4.3 Central Valley Area

This transmission corridor extends from Rosamond in the Mojave Desert to Tracy and uses studies for the existing Path 15 and 26 corridors through Los Angeles, Kern, Fresno, Kings, Merced, Modesto, and San Joaquin counties as a proxy for cultural resources. For a discussion of the southern portion in the West Mojave, see Section III.8.7.1.2, Los Angeles Area.

III.8.4.3.1 Cultural Resources Background and Context

The Central Valley area encompasses at least three major environmental provinces: foothill, mountain, and desert.

Prehistory

The Paleo-Indian Period (13,550 to 10,550 BP) begins with the first human occupation of California. Sites from this time period are characterized by "lanceolate bifaces, usually with an edge ground concave base, that exhibits a large central flake scar running from the basal end up the middle of at least one face toward the tip" (Rondeau et al. 2007). At the regional level the people who made them are also referred to as Folsom and Clovis, and in California the assemblages have been referred to as the "Fluted Point Tradition." Paleo-Indian finds are rare and mostly consist of isolated artifacts without clear stratigraphic associations, but are understood to represent the earliest occupants of the New World. Paleo-Indian sites in the interior primarily date to around 10,000 BP and are located near lakes and marshes.

The Lower Archaic (10,550 to 7550 BP) has also been referred to as the "Western Pluvial Lakes Tradition" in interior California and the "Paleo-Coastal Tradition" along the coast. It is primarily represented by isolated finds of distinctive stemmed projectile points and other flaked stone tools such as stone crescents. The common occurrence of large heavily worked projectile points has led to the interpretation that hunting artiodactyls was the focus of Early Archaic economies.

The Middle Archaic (7550 to 2550 BP) is marked by a dramatic increase in temperatures that resulted in the shrinking and complete disappearance of regional lakes. In general, this

time period is associated with a shift to mortar and pestle, more intensive subsistence practices, greater residential stability, the increasing importance of fishing, basketry, simple pottery, and clay objects, and the establishment of extensive exchange networks. During this time there were two distinct settlement–subsistence patterns in the San Joaquin Valley: the valley floor pattern and the foothills pattern. Archaeological sites associated with the foothills pattern are common, especially in buried contexts. Middle Archaic sites on the valley floor are rare, probably due to natural geomorphic changes.

The Upper Archaic (2550 to 900 BP) was cooler and wetter than the Middle Archaic. This evidence suggests that this period was characterized by the development of distinct sociopolitical entities, marked by contrasting burial postures and artifact styles. Subsistence practices within the valley emphasized a heavy reliance on acorns; at the valley edge, acorns were supplemented with pinyon nuts.

The Emergent Period (900 BP to historic contact) is characterized by the onset of cultural patterns similar to those existing at the time of European contact. During this time, large populous mound villages were established along river channels and sloughs. These communities invested in the construction of fish weirs and became increasingly dependent on fishing, small seeds, and plant harvesting in general over time. The local production of shell beads also became common, indicating the adoption of beads as a monetized system of exchange (Rondeau et al. 2007).

Ethnography

The Central Valley area is located within the vast traditional territory claimed by the California Native American group known as Yokuts, as presented in Table III.8-13.

Table III.8-13
Ethnographic Groups in the Central Valley Area

Ethnographic Group	Language Family	Territory
Yokuts	Penutian	San Joaquin Valley, eastern South Coast Ranges, and Sierra Nevada foothills of central California

Source: Rosenthal et al. 2007

History

As discussed earlier, the historic period of the San Joaquin Valley is generally divided into the Spanish Period, the Mexican Period, and the American Period. The San Joaquin Valley's combination of large wetland areas and the surrounding arid lands made it unsuitable for the kind of agriculture Euro-Americans practiced so non-Native American settlement did

not occur on any significant scale in the LUPA Decision Area until the late nineteenth century, when irrigation systems were developed.

Sporadic Spanish, and later Mexican, Russian, and American explorations in the "Great Valley" fed international tensions, but resulted in no settlement. The missionaries recruited and settled a few Southern Valley Yokuts at missions San Luis Obispo, San Juan Bautista, Soledad, and San Antonio, but the Spanish had little impact on the great majority of the Southern Valley Yokuts. In the 1840s the Mexican authorities made a few large rancho grants of San Joaquin Valley land, but no actual homesteads were established there under the Mexican authorities.

California was admitted as a state in 1850. In 1851, the Yokuts, along with several other San Joaquin Valley tribes, agreed to relinquish their land, opening it to settlement under federal land laws. These laws fundamentally shaped the early history of the region. The fertility of the region's soils under irrigation proved to be great. In the wake of the Gold Rush, the territory of the Southern Valley Yokuts was overrun and seized by white settlers. The Yokuts, never very warlike, greatly reduced in numbers, and vulnerable in their exposed open habitat, put up little resistance (Rosenthal et al. 2007).

III.8.4.3.2 Cultural Resources in the Central Valley Area

Although the total number of cultural resources present in this area is unknown, a rough order of magnitude estimate can be derived based on surveys related to the Los Banos–Gates Transmission Project. Table III.8-14 presents information on the types of cultural resources identified during these surveys. Prehistoric resources include milling stations, lithic scatters and prospects, village sites, rock art (cupule sites), temporary campsites, and roads. Historic resources include an oil field, oil pumping station, railroad alignment, house site, Los Banos Creek (California Historical Landmark No. 550), debris scatters, trash dump, aqueduct, wagon road, and numerous roads (CPUC 2001; ICF International 2011).

Table III.8-14
Cultural Resources Types in the Central Valley Transmission Corridor Area

Time Period	No. of Resources	Percent	No. of Resources/Acre
Prehistoric	11	32.4%	0.001
Prehistoric (human remains)	1	2.9%	0.000
Historic	22	64.7%	0.001
Multicomponent and Unknown	0	0%	0.000
Total	**34**	**100%**	**0.002**

Assuming a survey area of 20,752 acres for a corridor 129.7 miles long and 1,320 feet wide

Tables III.8-15 and III.8-16 show the typical number of cultural resources that could potentially be affected by transmission line corridors and substations.

Table III.8-15
Typical ROW Widths and Linear Impacts of Bulk Transmission to Central Valley Area Cultural Resources

Transmission Line Voltage	Transmission ROW Corridor Width (feet)	Access Road Width (feet)	Potential Extent of Effects/Linear Mile (in Acres)	Potential No. of Resources Affected/Linear Mile
230 kV				
Double-Circuit Tower Line	100	24	15	0.03
500 kV				
Single-Circuit Tower Line	200	24	27	0.05
Two Single-Circuit Tower Lines	450	24	57	0.11
Three Single-Circuit Tower Lines	700	24	88	0.18
Four Single-Circuit Tower Lines	950	24	118	0.24

Note: Access road width is added to ROW width for total width of linear disturbance.

Table III.8-16
Impacts of Substation Construction to Cultural Resources in the Central Valley Area

Substation Type	Size (Acres)	Potential No. of Resources Affected
66 kV Collector Substation	39 acres	0.08
230/66 kV Collector Substation	77 acres	0.15
500/230 kV Collector Substation	176 acres	0.35
500/230/66 kV Super Collector Substation	215 acres	0.43

III.8.4.4 North Palm Springs–Riverside Area

This transmission corridor extends from approximately Desert Center south of Joshua Tree National Park to Devers Substation to Rialto in San Bernardino County, and uses the existing Devers–Palo Verde No. 2 corridor west from Palm Springs as a proxy for cultural resources.

III.8.4.4.1 Cultural Resources Background and Context

The North Palm Springs–Riverside area encompasses at least two major environmental provinces: mountain and desert.

Prehistory

The prehistoric cultural sequence comprises two major periods: the San Dieguito/Mojave (12,000 to 3200 BP) and the Amargosa (3200 to 800 BP). The San Dieguito Complex is subsumed within the Mojave I period, a period lasting between 12,000 and 6000 BP. During this period, populations adapted to the cooler and moister conditions of the sub-Pleistocene environment.

The Mojave II period, between 6000 and 3200 BP, is often placed within the Milling Stone Horizon. Environmental conditions fluctuated between warm and dry to cool and wet, to warm and wet to warm and dry during this period. Settlement patterns were similar to earlier phases and related to the procurement of fluctuating and widely dispersed resources.

The Amargosa I occurred between 3200 and 1400 BP. A wide range of floral and faunal resources was exploited during this period by regionally specialized hunters and gatherers who used a more scheduled movement across various environmental zones. Food sources including small game, nuts, seeds, and berries were used. The Amargosa II took place between approximately 1400 and 800 BP. This is characterized by increasing numbers of small projectile points in archaeological assemblages, indicating the introduction of the bow and arrow (CPUC and BLM 2006).

Following the Amargosa Period are a number of regional chronological units, in which the cultures attested ethnographically formed (Sutton et al. 2007).

Ethnography

The North Palm Springs–Riverside area crosses through both the present and ancestral ethnographic territories of the Serrano, Cahuilla, Chemehuevi, Quechan, and Panya (Halchidhoma) people. Their languages and territories are presented in Table III.8-17 (CPUC and BLM 2006).

Table III.8-17
Ethnographic Groups in the North Palm Springs–Riverside Area

Ethnographic Group	Language Family	Territory
Serrano	Takic	San Bernardino Mountains east to Mount San Gorgonio, the San Gabriel Mountains west to Mount San Antonio, and portions of the desert to the north and the fringe of the San Bernardino Valley

Table III.8-17
Ethnographic Groups in the North Palm Springs–Riverside Area

Ethnographic Group	Language Family	Territory
Cahuilla	Takic	San Bernardino Mountains in the north to Borrego Springs and the Chocolate Mountains in the south, a portion of Colorado Desert west of Orocopia Mountain to the east, and the San Jacinto Plain near Riverside and the eastern slopes of Palomar Mountain to the west
Chemehuevi	Numic	Colorado River Valley
Quechan	Yuman	Colorado River areas south of Panya
Panya (Halchidhoma)	Yuman	Palo Verde Valley

History

As discussed earlier, the history of the region is generally divided into the Spanish (1769-1821), Mexican (1821-1846), and American (after 1846) periods. Hernando de Alarcón sailed up the Colorado River in 1540 marking the first European entrance into the Arizona/California region. More substantial Spanish exploration began with the entradas of Father Jacobo Sedelmayr in 1744 when he traversed what is now Blythe. Francisco Garcés and his party in 1771 crossed portions of the area and then returned in 1776.

Two of the earliest settlers within the North Palm Springs–Riverside Area were Daniel Sexton and Pauline Weaver in 1841 or 1842. The pair traveled north from San Gorgonio Pass and into Edgar Canyon (present-day Little San Gorgonio Creek) and set up a primitive sawmill. San Timoteo Canyon was a common travel route both prehistorically and historically, and the Southern Pacific Railroad was completed through the canyon in 1870. In San Bernardino County, one of the communities the railroad passed through was Colton, a city established in 1873.

In the early 1880s the Atlantic and Pacific Railroad (now the Santa Fe Railway) completed its track system across the California desert, and brought miners who coaxed tungsten, gold, and silver from the soils in the Old Woman Mountains and the Chuckwallas. The southern transcontinental line, also known as the Sunset Route, was completed on January 12, 1883, and created an even greater influx of people into Southern California. By the 1930s, paved roads spread from towns on the Colorado River such as Needles and Yuma. Notable settlements included Desert Center and Chambless. The Metropolitan Water District aqueduct was constructed between 1934 and 1941.

General George Patton's Desert Training Center (1942-1944) served as the training grounds for soldiers and equipment bound for the deserts of Africa. This training center spread over many square miles and included not only semi-permanent operations facilities but also outlying tank training grounds, infantry camps, and outposts (CPUC and BLM 2006).

III.8.4.4.2 Cultural Resources in the North Palm Springs–Riverside Area

Although the total number of cultural resources present in this area is unknown, a rough order of magnitude estimate can be derived based on recent surveys related to the Devers–Palo Verde No. 2 Project (CPUC and BLM 2006). Table III.8-18 presents information on the types of cultural resources identified during these surveys. Two resources are listed on the NRHP and 33 resources are potentially eligible for the NRHP and the CRHR. Prehistoric resource types consisted of lithic scatters, temporary encampments, rock rings and alignments, quartz assays/reduction stations, and trail segments. Historic resources included refuse scatters, road segments, Desert Training Center sites, foundations, canals, drains, ditches, and railroad segments.

Table III.8-18
Cultural Resources Types in the North Palm Springs–Riverside Transmission Corridor Area

Time Period	No. of Resources	Percent	No. of Resources/Acre
Prehistoric	50	54.9%	0.032
Historic	38	41.8%	0.025
Multicomponent	3	3.3%	0.002
Total	**91**	**100%**	**0.060**

Based on a survey acreage of 1,518 acres.

Tables III.8-19 and III.8-20 show the typical number of cultural resources that potentially could be affected by transmission line corridors and substations.

Table III.8-19
Typical ROW Widths and Linear Impacts of Bulk Transmission to North Palm Springs–Riverside Area Cultural Resources

Transmission Line Voltage	Transmission ROW Corridor Width (feet)	Access Road Width (feet)	Potential Extent of Effects/Linear Mile (in Acres)	Potential No. of Resources Affected/Linear Mile
230 kV				
Double-Circuit Tower Line	100	24	15	0.90
500 kV				
Single-Circuit Tower Line	200	24	27	1.62
Two Single-Circuit Tower Lines	450	24	57	3.42
Three Single-Circuit Tower Lines	700	24	88	5.28
Four Single-Circuit Tower Lines	950	24	118	7.08

Note: Access road width is added to ROW width for total width of linear disturbance.

Table III.8-20
Impacts of Substation Construction to Cultural Resources in the North Palm Springs–Riverside Area

Substation Type	Size (Acres)	Estimated Number of Resources Impacted
66 kV Collector Substation	39 acres	2.34
230/66 kV Collector Substation	77 acres	4.62
500/230 kV Collector Substation	176 acres	10.56
500/230/66 kV Super Collector Substation	215 acres	12.90

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III.9 NATIVE AMERICAN INTERESTS

This chapter addresses both contemporary and traditional concerns of Native Americans and organized tribal governments. It focuses on concerns specific to Native Americans within the LUPA Decision Area and DRECP area boundaries, to which Native Americans bring distinct perspectives. This chapter also identifies federal laws and regulations that govern Native American interests on land traditionally occupied or used by Native Americans.

Central to understanding both the contemporary and traditional concerns of Native American tribes within the LUPA Decision Area is an understanding of what each tribe describes as "traditional cultural values." According to Parker and King, "Traditional cultural values are often central to the way a community or group defines itself, and maintaining such values is often vital to maintaining the group's sense of identity and self-respect" (1998).

Of particular cultural value to tribes are Traditional Cultural Properties, (TCPs), sacred sites, and cultural landscapes. These terms are defined in more detail in Chapter III.8, Section III.8.2.1, and examples are provided in Section III.9.4.2 of this chapter. Recent ethnographic studies associated with renewable energy and transmission development have identified several TCPs and cultural landscapes of importance to Native Americans in the California Desert (Braun et al. 2013; Gates 2012; Braun et al. 2013). Also of importance to Native Americans are archaeological objects and sites such as habitation sites, camps, lithic reduction features (quarries), trail segments, rock rings, among others. Plants, animals, and minerals are also thought to hold cultural and spiritual significance since they were used for food, medicine, ceremony, and manufacturing items. Additional Native American concerns relate to the levels of planning and participation involved in renewable energy project development. Specifically, tribes have expressed concern over the following issues, which are discussed in more detail in Section III.9.4.1: (1) consultation, (2) ethnography, (3) document review, (4) confidentiality, (5) monitoring, (6) repatriation, (7) access, and (8) environmental justice (EJ).

III.9.1 Regulatory Environment

Federal regulations relevant to the protection of Native Americans follow. Many of these regulations also apply to the protection of cultural resources and are described in more detail in Section III.8.1. Federal legislation, regulations, and policies specific to projects on Native American tribal lands are not included. Regulations in this section are organized in the following manner: acts, executive orders, secretarial orders, bills, and codes. Within each of these categories, individual laws and regulations are organized by date of enactment.

Antiquities Act of 1906 (16 United States Code [U.S.C.] 431-433). See Chapter III, Section III.8.1 for details.

Bald and Golden Eagle Protection Act of 1940 (Eagle Act) (16 U.S.C. 668-668[d]) allows the Secretary of the Department of the Interior (DOI) to permit the taking, possession, and transportation of bald eagle or golden eagle specimens for the religious purposes of Indian tribes, as well as for other scientific or exhibition purposes (Section 668(a]). In 2009, the U.S. Fish and Wildlife Service promulgated a new permit rule under the Eagle Act that provides a mechanism to authorize unintentional take of eagles (50 Code of Federal Regulations [CFR] 22.26; 74 Federal Register [FR] 46836). The final regulation ensures that requests by Native Americans to take eagles from the wild are given first priority over all other take, except as necessary to alleviate safety emergencies. This criteria applies where the take of live, wild eagles is absolutely necessary to meet the religious purposes of the tribe, as opposed to the use of feathers and parts that may be obtained from the National Eagle Repository. Permit regulations governing take and possession of eagles by Native Americans are set forth in 50 CFR 22.22. Even if not on reservation land, eagles, eagle nests, and other sites have cultural significance to many Native American tribes and tribal members.

National Historic Preservation Act of 1966 (Public Law [PL] 89-665; 16 U.S.C. 470-1). See Chapter III, Section III.8.1 for details.

National Trails System Act of 1968 (16 U.S.C. 1241 et seq.). See Chapter III, Section III.8.1 for details.

National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.). See Chapter III, Section III.8.1 for details.

Federal Land Policy Management Act of 1976 (43 U.S.C. 1701 et seq.). Section 601 of the Federal Land Policy Act defines the California Desert Conservation Area (CDCA) and provides guidelines for the creation of a comprehensive, long-range plan for the management, use, development, and protection of the public lands within the CDCA.

Appendix VIII of the CDCA Final environmental impact statement (EIS) describes the Native American Element of the CDCA (see Figure III.9-1) and attempts to address both the contemporary and traditional concerns of Native Americans and organized tribal governments. The focus is on traditional heritage and religious concerns and long-range goals and planning efforts. The Native American Element includes the CDCA landscape; wildlife species; prehistoric and historic occupation, worship, domestic activities sites, and plant and animal resources. These resources are important because of their respective roles in ritual or in the origin accounts of a Native American group. Other goals

of this element include (1) the identification of Native American values through consultation, (2) the full consideration of these values in land use planning and management decisions, and (3) the management and protection of these values.

This element also addresses the Bureau of Land Management's (BLM's) approach to legislation that directs the degree and types of Native American consultation and involvement in cultural resource management programs. Some of these include providing access to sacred sites for worship, preserving the confidentiality of Native American information submitted to BLM, restricting public access to field inventory data, developing procedures for identifying concerns, and following procedures for Native American contact and consultation.

Four key issues were identified in this element. First, it acknowledges the difficulties in identifying, protecting, and mitigating impacts to Native American resources. A key observation relevant to the current study is that the "accurate evaluation of potential impacts on cultural values can only be made within the cultural context from which those values are derived" (BLM 1980, Native American Element). In other words, the identification of an impact and the design of appropriate mitigation, if any, must be made in consultation with concerned Native American representatives. Second, the element identifies the need and provides specific guidelines for incorporating formal comments from tribal governments into BLM's environmental review process. Third, this element states that conflicts between Native American values and other activities (such as mining or grazing) can best be identified and resolved through consultation and detailed management plans. Finally, the element acknowledges that many impacts on Native American values are not amenable to mitigation. Nonetheless, "these substantial potential and often irreversible impacts on cultural values will be carefully considered in all actions of the Plan" (BLM 1980, Native American Element).

Some of the management tools identified include (1) multiple-use classes drafted to incorporate Native American concerns, (2) incorporation of concerns into general Plan guidelines and other Plan elements, (3) the designation of Areas of Critical Environmental Concern, and (4) the development of guidelines for management of heritage values and formal tribal consultation.

The priorities for implementation of this element emphasize the protection of resources in Areas of Critical Environmental Concern and areas of extensive, diverse, and sensitive cultural values, as illustrated by a map of these key locations (BLM 1980, Cultural Resources Element Map). The element map is now three decades old and is a substantial baseline reflection of Native American heritage values in the DRECP area.

American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996). The American Indian Religious Freedom Act of 1978 (AIRFA) was passed to prevent federal agency

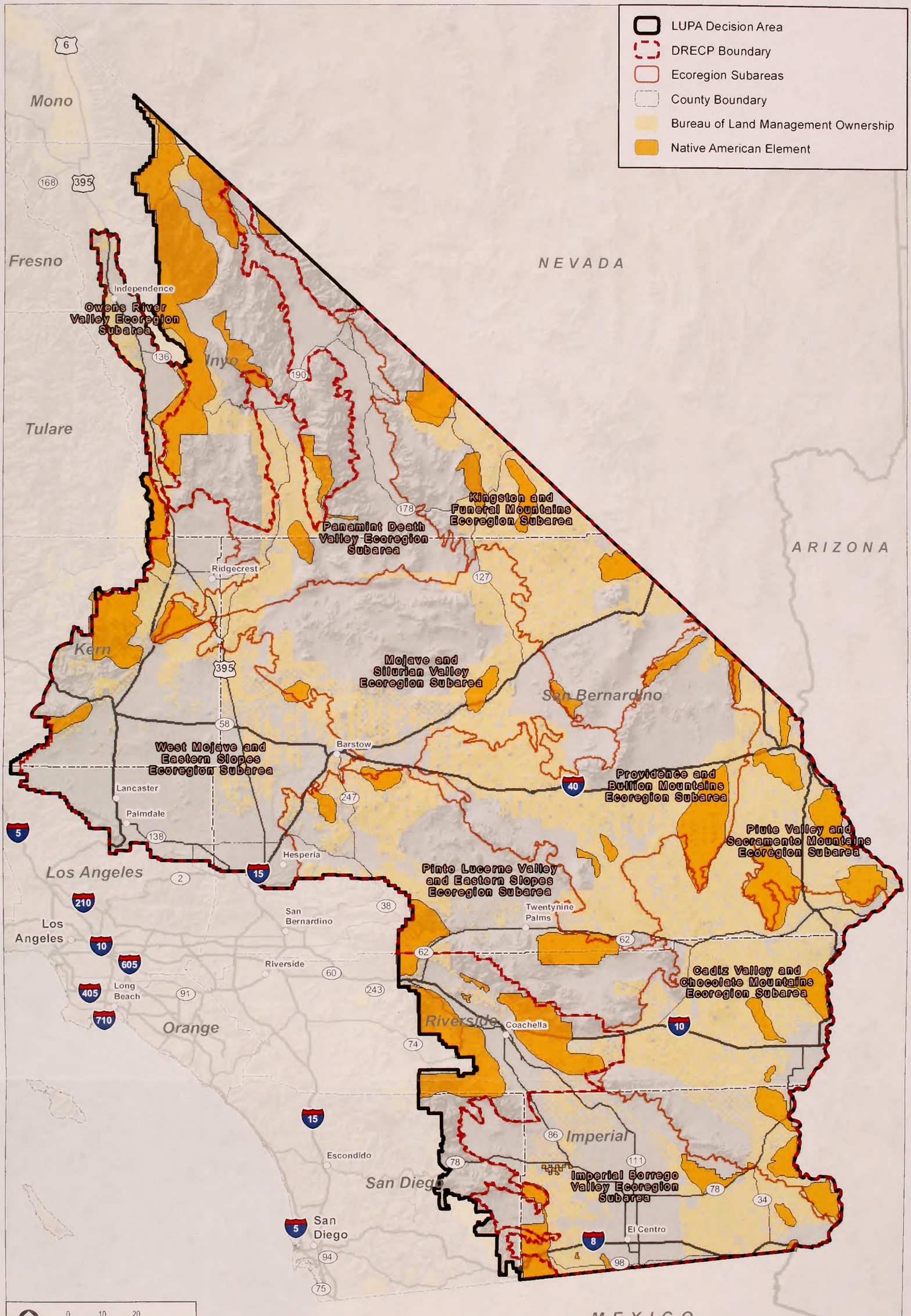
encroachment on or access to Native American religious places and related practices that are located or conducted on federal land or where federal actions would otherwise infringe on Native Americans' constitutional rights to freedom of religion. AIRFA also recognized the rights of Native Americans to possess religious objects. Native Americans were provided special recognition due to the federal government's attempt to reverse some of its previous Indian policies that forbade the expression of Native American religion. A U.S. Forest Service decision to build a road (the "Gasquet to Orleans" or "G-O" Road) through a sacred landscape in Northwestern California in order to provide access between coastal mills and inland forests was litigated by environmental groups and an Intertribal nonprofit in the 1980s. The case eventually was accepted by the U.S. Supreme Court, which ruled that the constitutional right to the freedom of religion is only hampered by the federal government when the government takes actions intended to directly suppress religion. It was reasoned by the U.S. Supreme Court majority opinion that the sole mission and intent of the U.S. Forest Service's desire to build the GO Road was to connect forests with mills to increase timber production and employment and it was not the intent of the agency to infringe on Native American religious expression. Since that decision, AIRFA has been considered to have little relevance for environmental regulatory practice and further meaningful utilization of the law has been sparse. Concern over the implications of this decision resulted in the passage of the Religious Freedom Restoration Act (RFRA) of 1993, described below.

Archaeological Resources Protection Act of 1979 (16 U.S.C. 470[aa-mm]). See Chapter III, Section III.8.1 for details.

Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001-13). See Chapter III, Section III.8.1 for details.

Religious Freedom Restoration Act of 1993 (42 U.S.C. 2000[bb]-2000[bb-4]). Efforts to regain what the U.S. Supreme Court AIRFA decision had limited led Congress to enact RFRA. The Act essentially amended AIRFA by establishing that Native American religious access, worship, and object possession were similarly harmed by the government whether or not the action was done with intent to harm Native American religion or to carry forth an agency's mission. RFRA further provides that should the government wish to go forward with an action that would impact Native American religious freedom then the action must be of a compelling governmental interest. However, subsequent case law clearly established that RFRA did not apply to the state or local government jurisdictions and authorities. That is to say, AIRFA and RFRA are applicable only on federal lands and for federal agencies.

Omnibus Public Lands Management Act of 2009 (P.L. 111-11). See Chapter III, Section III.8.1 for details.



Sources: ESRI (2014), BLM (2015), RECON (2015)

FIGURE III.9-1

Native American Elements within the LUPA Decision Area and DRECP Plan Area

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Executive Order 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994). This Executive Order requires that federal agencies adopt strategies that address EJ concerns within agency operations. Existing laws should provide opportunities for federal agencies to address environmental hazards in minority and low-income communities. It also establishes agencywide goals for American Indian, Alaska Native, and other indigenous peoples (e.g., Native Hawaiians) (59 FR 7929). Additional detail is provided in Chapter III.23, Socioeconomics and Environmental Justice.

Council on Environmental Quality's Environmental Justice Guidance under the National Environmental Policy Act. To ensure that EJ concerns are effectively identified and addressed according to Executive Order 12898, the Council on Environmental Quality (CEQ), in consultation with the United States Environmental Protection Agency (EPA), developed guidelines to assist federal agencies with implementation of procedures. According to CEQ's "Environmental Justice Guidance Under NEPA," (National Environmental Policy Act) agencies should consider the composition of affected areas to determine whether minority or low-income populations are affected by a proposed action, and, if so, whether those environmental effects may be disproportionately high or adverse (CEQ 1997).

According to CEQ EJ guidelines, minority populations should be identified if:

- A minority population percentage either exceeds 50% of the population of the affected area.
- If the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (e.g., a governing body's jurisdiction, neighborhood census tract, or other similar unit).

Environmental Protection Agency Final Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses. This document defines how EPA will ensure that disproportionately high and adverse human health or environmental effects on minority communities and low-income communities are identified and addressed. It establishes agency-wide goals for engaging American Indian, Alaska Native, and other indigenous peoples (e.g., Native Hawaiian). It also establishes agency-wide goals for environmental protection and lists actions the EPA would take to incorporate EJ into its mission (EPA 1998).

Environmental Protection Agency Plan Environmental Justice 2014. The EPA's Plan Environmental Justice (EJ) 2014 is a strategy to help the agency integrate EJ into its programs, policies, and activities. Plan EJ 2014 identifies Cross-Agency Focus Areas, Tools Development, and Program Initiatives as the three essential Elements that will advance EJ

across EPA and other federal agencies. Plan EJ 2014 is not yet a rule or regulation and is currently under development (EPA 2011).

EPA Policy on Environmental Justice for Working with Federally Recognized Tribes and Indigenous Peoples 2014. This policy establishes 17 principles to ensure that achieving EJ is part of the EPA's work with federally recognized tribes, state-recognized tribes, individual tribal members, indigenous community-based and grass-roots organizations, and others living in Indian country. These principles include six related to consultation and coordination, three regarding tribal environmental protection programs, four encouraging fair treatment and meaningful involvement, and three related to intergovernmental coordination and collaboration (EPA 2014).

Executive Order 13007 Indian Sacred Sites (1996). See Chapter III, Section III.8.1 for details.

Executive Order 13175 Consultation and Coordination with Indian Tribal Governments (2000). In formulating or implementing policies that have tribal implications, agencies shall respect Indian tribal self-government and sovereignty, honor tribal treaty and other rights, and strive to meet the responsibilities that arise from the unique legal relationship between the federal government and Indian tribal governments. The Executive Memorandum of April 29, 1994, outlines the principles that agencies are to follow in their interactions with Native American tribal governments.

Executive Order 13287 Preserve America (2003). See Chapter III, Section III.8.1 for details.

Secretarial Order 3206 American Indian Tribal Rights and the Endangered Species Act (1997). This order was issued by the Secretary of DOI and the Secretary of Commerce, pursuant to the Federal Endangered Species Act, the federal-tribal trust relationship, and other applicable laws. It requires that federal agencies be sensitive to Native American cultures, religions, and spirituality, and recognizes that these traditional activities often involve the ceremonial and medicinal uses of plants, animals, and specific geographic locations. In partnership with the tribes, the agencies must promote the conservation of sensitive species and the health of the ecosystems in which they live. Federal agencies shall make available to Indian Tribes information related to tribal resources and Indian lands and to facilitate the mutual exchange of information. Sensitive tribal information shall be protected by federal agencies (Secretarial Order 3206).

Secretarial Order No. 3317 Policy on Consultation with Indian Tribes (2011). This order updates, expands, and clarifies DOI's policy on consultation with American Indian and Alaska Native tribes, and acknowledges that the provisions for conducting consultation in compliance with EO 13175 and applicable statutes or administrative

actions are expressed in the Department of the Interior Policy on Consultation with Indian Tribes.

Secretarial Order No. 3330 Improving Mitigation Policies and Practices of the Department of the Interior (2013). See Chapter III, Section III.8.1 for details.

BLM State Protocol Agreement with the California State Historic Preservation Officer and the Nevada State Historic Preservation Officer (2014). See Chapter III, Section III.8.1.1 for details.

BLM National Programmatic Agreement with the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers (2012). See Chapter III, Section III.8.1 for details.

Programmatic Agreement among DOI, BLM, the Arizona State Historic Preservation Officer (SHPO), the California SHPO, the Colorado SHPO, the New Mexico SHPO, the Nevada SHPO, the Utah SHPO, and the Advisory Council on Historic Preservation Regarding Solar Energy Development on Lands Administered by the BLM (2012a) (See Chapter III, Section III.8.1 for details.)

III.9.2 Tribes with Interests in the LUPA Decision Area

This section defines and describes the LUPA Decision Area and its tribal communities. The methods used in this analysis combine cultural resources analysis (see Chapter III.8) and EJ methods (see Chapter III.23).

III.9.2.1 Tribal Communities in the LUPA Decision Area

This section describes the tribal communities potentially impacted by the Proposed LUPA. Please see Section III.8.2.3 for a detailed discussion of the ethnographic context of the LUPA Decision Area. The communities described here are only those tribal communities with traditional affiliations in the LUPA Decision Area. As discussed in Chapter III.8, Cultural Resources, a number of Native American groups traditionally inhabited the LUPA Decision Area, including the Kumeyaay, Cocopah, Quechan, Halchidoma, Mojave, Cahuilla, Serrano, Kitanemuk, Kawaiisu, Southern Paiute (Pahrump, Moapa and Chemehuevi), Western Shoshone, and Owens Valley Paiute (Kroeber 1925; Figure III.8-2). The territorial boundaries of tribes who inhabited the LUPA Decision Area changed over time and overlapped, so resources could be accessed and procured by different groups.

According to the Native American Heritage Commission (NAHC), there are 44 federally recognized tribes and 9 unrecognized tribal communities with traditional affiliations in the LUPA Decision Area (NAHC 2011). A federally recognized tribe can be defined as "an American Indian or Alaska Native tribal entity that is recognized as having a government-

to-government relationship with the United States, with the responsibilities, powers, limitations, and obligations attached to that designation, and is eligible for funding and services from the Bureau of Indian Affairs" (BIA 2014). Federally recognized tribes possess the right to self-determination and governance and are afforded various federal benefits, services, and protections because of their unique relationship with the United States. Public Law 103-454, the Federally Recognized Indian Tribe List Act, established three ways in which an Indian group can achieve federal recognition: (1) by an act of Congress; (2) by the administrative procedures under 25 CFR Part 83, Procedures for Establishing that an American Indian Group Exists as an Indian Tribe; and (3) by decision of a United States court. Currently, there are 566 federally recognized tribes in the United States (BIA 2014).

As self-governing entities, federally recognized tribes have the right to form their own governments, to make and enforce laws, to tax, to establish and determine membership, to license and regulate activities within their jurisdiction, to zone, and to exclude persons from reservation land (BIA 2014). Several federal laws and regulations (Sections III.8.1 and III.9.1) require agencies to conduct government-to-government consultation with tribes affected by proposed projects. The federal government consults on a government-to-government basis with federally recognized tribes. In addition, under Section 106 of the NHPA, federal agencies can consult with unrecognized tribes as additional consulting parties (36 CFR 800.2 [c][5]).

These communities, listed in Table III.9-1, are the focus of the analysis in this section. Many of these communities are regularly asked by federal agencies to participate in NEPA and Section 106 activities associated with the LUPA Decision Area. Members of these communities may or may not live within the LUPA Decision Area.

Table III.9-1 lists all tribes with traditional affiliations to the LUPA Decision Area and identifies both federally recognized and non-federally recognized tribes. In addition, the table identifies which groups have staff able to participate in NEPA and Section 106 document review, government-to-government consultation, and other related tasks.

Table III.9-1
Tribes with Traditional Ties to LUPA Decision Area

Name of Tribe	Tribal Enrollment	Cultural Affiliation	Environmental Staff?
Agua Caliente Band of Cahuilla Indians	418	Cahuilla	Yes
Augustine Band of Cahuilla Indians	8	Cahuilla	Unknown
Barona Band of Mission Indians	455	Kumeyaay	Yes
Big Pine Paiute Tribe of the Owens Valley	398	Owens Valley Paiute	Yes
Bishop Paiute Tribe	1,323	Owens Valley Paiute	Yes

Table III.9-1
Tribes with Traditional Ties to LUPA Decision Area

Name of Tribe	Tribal Enrollment	Cultural Affiliation	Environmental Staff?
Cabazon Band of Mission Indians	30	Cahuilla	Yes
Cahuilla Band of Mission Indians	307	Cahuilla	Yes
Campo Band of Diegueño Mission Indians	302	Kumeyaay	Yes
Chemehuevi Indian Tribe	928	Chemehuevi	Yes
Cocopah Tribe	940	Cocopah	Yes
Colorado River Indian Tribes	3,705	Mojave, Chemehuevi, Hopi, and Navajo	Yes
Ewiiaapaayp Band of Kumeyaay Indians	7	Kumeyaay	Unknown
Fort Independence Indian Community of Paiute Indians	101	Owens Valley Paiute	Yes
Fort Mojave Indian Tribe	497 (CA) 699 (AZ)	Mojave	Yes
Iipay Nation of San Ysabel	922	Kumeyaay	Yes
Inaja Band of Diegueño Mission Indians of the Inaja and Cosmit Reservation	19	Kumeyaay	Unknown
Jamul Indian Village	63	Kumeyaay	Unknown
Kaiwaiisu	200-300	Kaiwaiisu	Unknown
Kern River Indian Community	NA	Kaiwaiisu, Tubatulabal	Unknown
Kern Valley Indian Council	NA	Tubatulabal	Unknown
Kern Valley Paiute Council	NA	Owens Valley Paiute	Unknown
La Jolla Band of Luiseño Indians	604	Luiseño	Unknown
La Posta Band of Diegueño Mission Indians	16	Kumeyaay	Unknown
Las Vegas Tribe of Paiute Indians	54	Southern Paiute	Yes
Lone Pine Paiute-Shoshone Tribe	295	Owens Valley Paiute, Shoshone	Yes
Los Coyotes Band of Cahuilla and Cupeño Indians	288	Cahuilla, Cupeño	Unknown
Manzanita Band of Diegueño Mission Indians	105	Kumeyaay	Unknown
Mesa Grande Band of Diegueño Mission Indians	690	Kumeyaay	Unknown
Moapa Band of Paiute Indians	304	Southern Paiute	Yes

Table III.9-1
Tribes with Traditional Ties to LUPA Decision Area

Name of Tribe	Tribal Enrollment	Cultural Affiliation	Environmental Staff?
Monache Intertribal Council	NA	Northfork Mono, Wobonuch, Estimbich, Michahay, Waksachi, Patwisha	Unknown
Morongo Band of Mission Indians	1,015	Cahuilla, Serrano, Chemehuevi	Yes
Pahrump Paiute Tribe	70	Southern Paiute	Yes
Pala Band of Luiseño Mission Indians	906	Cupeño, Luiseño	Yes
Pauma/Yuima Band of Luiseño Mission Indians	189	Luiseño	Unknown
Pechanga Band of Luiseño Mission Indians	1,342	Luiseño	Yes
Quechan Tribe	2,668	Yuma	Unknown
Ramona Band of Cahuilla Mission Indians	7	Cahuilla	Unknown
Rincon Band of Luiseño Mission Indians	575	Luiseño	Yes
San Manuel Band of Mission Indians	178	Serrano	Yes
San Pasqual Band of Diegueño Mission Indians	429	Kumeyaay	Unknown
Santa Rosa Band of Cahuilla Indians	141	Cahuilla	Yes
Santa Ynez Band of Chumash Mission Indians	213	Kumeyaay	Unknown
Soboba Band of Luiseño Indians	963	Luiseño, Cahuilla	Yes
Sycuan Band of the Kumeyaay Nation	73	Kumeyaay	Unknown
Tejon Indian Tribe	850	Kitanemuk, Kawaiisu, Yowlumne	Yes
Timbisha Shoshone Tribe	331	Shoshone	Yes
Torres-Martinez Desert Cahuilla Indians	573	Cahuilla	Yes
Tubatulabal Tribe	280	Tubatulabal	Yes
Twenty-Nine Palms Band of Mission Indians	13	Chemehuevi	Yes
Utu Gwaitu Paiute Tribe	50	Owens Valley Paiute	Unknown
Viejas Band of Kumeyaay Indians	268	Kumeyaay	Unknown

Notes:
Non–federally recognized.
BIA 2005.
San Diego State University 2011a.

San Diego State University 2011b. Members of the Kumeyaay Nation have already been counted under tribes listed in this table, including Barona, Campo, Inaja-Cosmit, La Posta, Manzanita, Mesa Grande, San Pasqual, Santa Ysabel, Sycuan, Viejas (Baron Long), and the Jamul Indian Village. About 1,200 living on reservations, with 2,000 more off-reservation.
Pritzer 2000. Enrolled membership in 1992.
Walker 2012. Enrolled membership in Kern Valley.
BusinessWire 2013.
The information provided in this column is derived from reviewing various tribal websites.

III.9.2.2 Environmental Justice

Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Environmental Justice analyses identify environmental and human health conditions that disproportionately affect minority communities and low-income communities. Definitions of these key concepts, drawn from *Guidance on Considering Environmental Justice During the Development of Regulatory Actions* (EPA 2015), are provided below.

- **Fair Treatment** means that no group of people should bear a disproportionate burden of environmental harms and risks, including those resulting from the negative environmental consequences of industrial, governmental and commercial operations or programs, and policies.
- **Meaningful Involvement** means that: (1) potentially affected community members have an appropriate opportunity to participate in decisions about a proposed activity that will affect their human health or environment, (2) the public's input can influence the regulatory agency's decision, (3) the concerns of all participants involved will be considered in the decision-making process, and (4) the decision makers seek out and facilitate the involvement of those potentially affected.
- **Minority and Indigenous Peoples** are defined by the White House Office of Management and Budget as including five distinct race and ethnic categories: American Indian, Native Hawaiian, or Alaska Native; Asian or other Pacific Islander; Black or African American; and Hispanic or Latino. Statistical data collected by the federal government, such as the U.S. Census, use this classification system.
- **Low-Income.** Environmental Justice analyses characterize low-income communities in a variety of ways. Several different low-income categories, such as families whose income falls above the poverty threshold but below the average household income for the United States, or below two times the poverty threshold may be identified. Additional socioeconomic characteristics such as educational attainment, baseline health status and health insurance coverage may also be useful for identifying, characterizing, and developing strategies for assessing and engaging low-income populations.

- **Disproportionate Impact.** The determination of whether there is a potential disproportionate impact from a particular project is ultimately a policy judgment informed by analysis and is the responsibility of the lead agency. These analyses depend on the availability of scientific and technical data. Examples of the type of information that may be useful to decision makers for considering whether or not effects are disproportionate include: (1) the severity and nature of health consequences, (2) the magnitude of the estimated differences in impacts between population groups, (3) mean or median exposures or risks to relevant population groups, (4) distributions of exposures or risk to relevant population groups, (5) characterization of the uncertainty, and (5) a discussion of factors that may make population groups more vulnerable.

A consistent approach across the nation for identifying Environmental Justice areas and populations has been challenging to develop and implement. The EPA's primary screening tool, the Environmental Justice Strategic Enforcement Assessment Tool, is still in draft form despite years of work. Some have argued that a uniform tool is not appropriate for measuring impacts to diverse populations, and advocate instead for multiple approaches designed for specific places and populations (Holifield 2014).

In the LUPA EIS analysis of Environmental Justice (Chapter III.23 and Chapter IV.23), Native Americans are included in a larger group of minorities that also include individuals who are Alaskan Natives, Asian or Pacific Islanders, Black (not of Hispanic origin), or Hispanic (CEQ 1997). The LUPA analysis used demographic information from 2010 census tracts in the DRECP area and defined an Environmental Justice population as when the minority population of the potentially affected area is greater than 50% of the total population. The analysis also follows CEQ guidance, which defines "low-income populations" as populations with mean annual incomes below the annual statistical poverty level. As shown in Table R1.23-1, 120 Census Tracts contain a low-income population equal to or greater than their respective county and 136 Census Tracts within the DRECP area have a minority population percentage greater than 50%. While the proportion of Native Americans in these Census Tracts and specialized Tribal Census Tracts are not identified, they are included in the overall analysis.

The environmental analysis presented in this chapter takes a different approach. Clearly, the tribal groups with traditional affiliations within the LUPA Decision Area and DRECP area are minority populations. However, the physical residence location for peoples who have spiritual connections to particular places was not considered relevant. Instead, community membership is used as a proxy for the number of individuals who might be disproportionally impacted by the Proposed LUPA regardless of residence. These analytical groups are considered more appropriate for the current analysis than Census Tracts

because they include people who may not participate in the census, allow for change through time, and allow for groups in multiple states.

As discussed above, the identification of low-income communities can be accomplished in a variety of ways. Incomes among the tribal communities analyzed here appear to be variable. Therefore, in this analysis, rather than focusing on identifying low-income groups, this study emphasizes the financial stress that the participation in NEPA and Section 106 process can put on the local tribal governments that provide these services. While some communities have paid staff, well-equipped offices, and training in these regulatory processes, others do not.

III.9.3 Native American Meetings

III.9.3.1 Previous Dialogues Related to Renewable Energy Development

Shortly prior to the initiation of consultation efforts for the DRECP, two tribal energy summits were held to discuss the increasing development of energy resources on traditional use areas. These meetings highlighted longstanding concerns of Native Americans regarding impacts to Native American lands and cultural values from energy development.

2011 Tribal Summit on Renewable Energy

The 2011 Tribal Summit on Renewable Energy, held in Palm Springs on January 11-13, brought together over 150 tribal representatives and officials from federal, state, and local government and the private sector. The summit included an overview of upcoming federal renewable energy projects and highlighted issues of tribal concern related to past and proposed renewable energy development. Issues of key importance related to: (1) the inability of tribes to effectively participate in the Section 106 process, (2) ensuring effective and appropriate consultation, (3) resource identification and evaluation, (4) improving communication between tribes and agencies, (5) stricter enforcement of agreement documents, and (5) consideration of mitigation as a last resort (ACHP 2011).

2011 Department of Energy Tribal Summit

The 2011 Department of Energy (DOE) Tribal Summit, held in Washington, D.C., on May 4-5, brought together over 350 people, including representatives from 54 tribes across the United States and agency leaders active in Indian energy. Summit attendees discussed a broad range of critical energy and environmental issues on Indian lands. Secretary of Energy Steven Chu announced two new energy initiatives at the summit: (1) the formation of an Indian clean energy and infrastructure working group that will provide a forum to survey, analyze, and provide viewpoints on real-time obstacles that tribes face in using

clean energy; and (2) the development of guidance that will direct DOE to, when possible, purchase renewable energy generated by tribal governments (DOE 2014).

III.9.3.2 Consultation for DRECP Proposed LUPA

In accordance with federal requirements that BLM contact all of the tribal groups identified in Table III.9-1, A meeting was also held on November 15, 2011, where BLM and tribal staff discussed creating maps for incorporation in the DRECP. The federal government-to-government consultation was initiated in 2011 by DOI, including BLM, and several agencies for the DRECP under NEPA, the Endangered Species Act, the NHPA, the American Indian Religious Freedom Act, and Executive Order 13175. Based on the size and complexity of the undertaking, BLM has determined that the development of a Programmatic Agreement (PA) is the most appropriate manner to meet their responsibilities under Section 106 of NHPA. Consultation continues and a record of the consultation, coordination, outreach, and development of the PA, occurring before release of the Draft DRECP from 2011 through finalization of the PA in late 2015, is summarized here and in Volume V, Consultation, Coordination, and Outreach; Appendix V-1, Table 1; and Appendix V-2, Update to Tribal Consultation, Coordination and Outreach.

Tribal Federal Leadership Conference

DOI and BLM, through the Tribal Federal Leadership Conference, with the participation of the U.S. Fish and Wildlife Service and BIA, solicited tribal input for renewable energy planning in the LUPA Decision Area. Seven of these conferences were held between September 2011 and February 2014, one pre-meeting, numerous technical meetings, and individual meetings with the 40 federally recognized tribes. Tribes were provided with information, maps, technical assistance, presentations, access to executive-level federal management, funding sources, and other specialized services.

The goals of these meetings were to solicit tribal input for the DRECP and incorporate tribal issues into future development planning in the LUPA Decision Area. More information on the Federal Tribal Leadership Conference is included in Section V.4, Government-to-Government Consultation. Appendix V-1, Table 1, lists both the dates and methods of government-to-government communications. These communications with BLM and other agencies created a deeper understanding of and appreciation for tribal concerns that will help BLM and other federal and state land managing agencies manage lands in an informed and fair manner. BLM provided technical support to tribes that requested it for mapping the areas they deemed significant in the LUPA Decision Area.

Identification of Sensitive and Nonsensitive Locations in the LUPA Decision Area and DRECP Area

In 2012, BLM geographic information system specialists worked with Native American tribes to create maps identifying sensitive and nonsensitive locations in the LUPA Decision Area and DRECP area. Information submitted by the tribes was embedded into data layers and included in alternative design but cannot be specifically expressed because of confidentiality concerns raised during consultation. This technical assistance was offered to all participating tribes.

On July 9, 2012, the following cultural data were sent to tribes: (1) cultural resources documents for lands in the Bishop and Bakersfield Field Offices that are included within the DRECP planning boundary; (2) the CDCA Plan, Cultural Resources Element and Native American Element planning maps; and (3) a collection of 24 cultural resources studies. The cultural resources studies represent the analysis and summary of the cultural resources identification efforts carried out to support the CDCA Plan, and further represent the baseline foundational documents for the CDCA Plan, subsequent amendments, program planning, and project review. Many of these studies were commissioned during the CDCA planning effort in the late 1970s and finalized and published in the early 1980s.

BLM Workshops

On December 17, 2012, the Description and Comparative Evaluation of Draft DRECP Alternatives, was released. This document contained: (1) a preliminary description of the affected environment and existing environmental conditions in the DRECP area, (2) an overview of some of the possible project alternatives that agencies were considering for inclusion in the Draft EIS, and (3) a discussion and tentative analysis of the potential impacts of those alternatives. Workshops were held in the five BLM field offices in the California Desert District so that tribal representatives could meet with BLM managers to learn about the document, review DRECP maps by field office, and provide comments on the planning effort.

Tribal Response Summary to Date

The BLM and DOI have met with most of the federally recognized tribes in face-to-face meetings, and have also contacted other potential consulting parties. This outreach has led to the exchange of information and discussion of concerns that have shaped the development of the DRECP. (Please refer to Vol. 5, Section V.4; Appendix V-1 [Table] and Appendix V-2, Update to Tribal Consultation, Coordination, and Outreach, for a more detailed summary of tribal participation in the planning process and tribal responses and concerns regarding the Proposed LUPA.) Consultation among BLM, tribes, and other consulting parties is ongoing and will continue after release of the Final DRECP EIS. Because of this ongoing consultation process and required consultation for future projects

within the LUPA Decision Area, Native American tribes will be able to add areas of concern to current knowledge.

III.9.4 Native American Concerns

Review of earlier documents, ethnographic studies conducted for renewable energy projects within the boundaries of the DRECP area, and government-to-government consultation to date, have collectively identified two broad areas of concern to tribes potentially affected by the Proposed LUPA. They are:

- The process of environmental review, permitting, and mitigation under NEPA and NHPA Section 106, and the role of Native Americans in that process. Process concerns appear in Section III.9.4.1.
- Impacts to the physical world: cultural resources (including traditional cultural properties and landscapes), human remains, natural resources, and landscapes. Physical concerns appear in Section III.9.4.2.

III.9.4.1 Process Concerns

Key tribal planning process concerns include, but are not limited to, the following thematic topics:

- **Consultation.** Consultation should be conducted early, often, and in an ongoing manner that is respectful of tribal sovereignty, heritage values, and that strives for meaningful dialogue. Tribes have been provided early access to meetings outside the public forum. Some tribes feel that the dialogue has been less than meaningful and are concerned that they be afforded additional consultation opportunities as the NHPA Section 106 process continues.
- **Ethnography.** Tribes feel that their heritage values are not fully considered by cultural resources analysis that weighs heavily on archaeological expertise and methods. Some believe that mitigation also tends to ensue from these more narrow non-native perspectives.
- **Document Review.** Tribes want access to cultural resources and other data sets to determine for themselves to what extent tribally valued resources are present, absent, or being considered during the planning process. Tribes also find that they are underfunded, understaffed and overwhelmed with various project document review workloads.
- **Confidentiality.** Tribes want a high level of assurance that protocols for keeping sensitive cultural resources and heritage value information out of the public purview. Tribes are also adamant that confidentiality requirements are not used to keep important information from tribal review.

- **Monitoring.** Tribal Monitoring is viewed by tribes as a last-ditch effort to protect cultural resources that could otherwise be damaged by construction. Tribes want assurances that tribal monitoring is routinely required for approved projects and that monitoring protocols provide Native American monitors sufficient authority to adequately protect cultural resources of tribal value. There is also a secondary issue with the level of tribal monitor training that is not consistent across all tribes, as well as the need to balance tribal monitoring experience with monitors that are most closely affiliated with specific project areas.
- **Repatriation.** Tribes want avoidance of archaeological materials to be the primary method for mitigating these cultural resources. If avoidance cannot be achieved, then some tribes may prefer repatriation instead of long-term curation.
- **Access.** Tribal traditional practitioners want to maintain access, to the extent feasible, to sacred places to conduct cultural and religious practices.
- **Environmental Justice.** Tribes affiliated with project areas through ancestral or traditional use claim they are EJ populations because tribal people maintain long-standing ancestral and traditional-use practices and concepts connected to the environment and to their identities as Indian people, unlike other populations that do not have territories linked to their collective identities. Tribes are requesting that EJ studies be conducted to link tribal resources with tribal cultural practices and their need to perpetuate traditional cultures that rely upon intact landscapes.

III.9.4.2 Physical World Concerns

Given the programmatic nature of this document, specific locations of concern to Native Americans in the LUPA Decision Area are not addressed. However, the Native American Element Map of the 1980 CDCA identified Areas of Critical Environmental Concern and areas of high sensitivity. These places continue to be considered sensitive. However, some tribes do not think that the areas of sensitivity reflected in the 1980 Cultural Element Map fully represent what is known today to be culturally sensitive. Indeed, specific renewable energy projects undergoing licensing in 2013 and 2014 have produced cultural landscapes documentation in areas that are not identified as culturally sensitive on the 1980 Cultural Element Map. Concerns related to the physical world include, but are not limited to, impacts to cultural resources and natural resources.

- **Cultural Resources.** Cultural resources are defined in Chapter III.8. In the following discussion, types of cultural resources in the LUPA Decision Area and DRECP area are listed, with examples of Native American interest in some of these resource types.
    - **Archaeological objects and sites.** Some of the archaeological resources identified in the LUPA Decision Area and the DRECP area that are associated with Native Americans include, but are not limited to: habitation sites, camps, human

remains, lithic reduction features (quarries), thermal features, trail segments, pot drops, cairns, cleared circles, rock rings, quartz shatter concentrations, rock art, and earth figures.

- **Traditional Cultural Properties.** Examples of TCPs for Native American communities may include natural landscape features, trail systems, places used for ceremonies and worship, places where plants are gathered for use in traditional medicines and ceremonies, places where artisan materials are found, and places and features of traditional subsistence systems, such as hunting areas. Given the nature of these resources, they may not necessarily be identified during conventional archeological, historical, or architectural surveys. As a result, the existence or significance of such locations often requires ethnographic input from the tribes viewing them as significant.
- **Cultural landscapes.** Tribes are particularly concerned with cultural landscapes because landscape analysis can consider culture in holistic ways that move beyond discrete objects and bounded sites. The California Office of Historic Preservation's (OHP) Statewide Historic Preservation Plan, 2013-2017, recommends that archaeological and ethnographic information be analyzed together in the identification and evaluation phases of cultural landscape documentation. The OHP has further identified the need for cultural resources professionals working on renewable energy projects to shift their focus from a site-level to a landscape-level assessment (OHP 2013). OHP's advice is partially echoed by Secretary of the Interior Order No. 3330. The following three examples illustrate how cultural landscapes of importance to tribes do exist in areas considered to be nonsensitive according to the 1980 Cultural Element Map.
  - The Salt Song Trail is a Southern Paiute sacred trail corridor that crosses several states and makes a circuit between the Mojave Desert and the southern portion of the Wasatch Range. It closely follows the Colorado River. It is a trail system believed to be traveled by the deceased who, with the aid of traditional practitioners who, through song, story, and prayer, usher the deceased along the path on their post-burial journey to the afterlife. The trail consists of physical marks on the land, both trail marks and natural land patterns, wayside locations where specific songs and other ceremonies are sung or conducted, and a corridor along the trail system.
  - The Keruk Xam Kwatcan/Earth Figures Landscape is a Yuman sacred trail corridor that parallels the Colorado River between Spirit Mountain in the north (near Laughlin, Nevada) and Pilot Knob in the south (near Yuma, Arizona). A significant third sacred mountain located in the approximate mid-portion of the trail corridor is Palo Verde Peak. It is a trail system that the deceased are believed to follow after the cremation ceremony as they

make their way to the afterlife, and where living people travel to assist the departure of their deceased ancestors. It is also a trail that traditional Yumans take as a pilgrimage of return to the place of creation. For those who have proper training, the trail can also be travelled in dreams. The trail is a physical mark on the land (in some places consisting of parallel trails and trails on both sides of the river) with numerous wayside locations, which include many earth figures. The earth figures also have many contributing features such as cleared circles, rock cairns, altars, cul-de-sac trails, altars, and lithics, including shattered quartz. The Mule Mountains and immediate surrounding environs are believed to be a place where souls may go to wait out the year of mourning between the cremation ceremony and the final journey to the afterlife.

- The Pacific to Rio Grande Trail Landscape, a cultural landscape that reflects a major trail corridor that connects the Southern California Pacific Coastline to the northern Rio Grande Valley and includes three prominent trail corridors: the Northern (I-40 [Interstate] I-15) corridor, the Central (I-10) corridor and the Southern (I-8) corridor. The landscape is bounded on the North (and listed from west to east) by the Santa Barbara Mountains, the Garlock Fault, the Spring Mountains, the Colorado Plateau and the Northern Rio Grande Valley (Santa Fe, New Mexico). The landscape is bounded on its southern extent by the northern terminus of the Sea of Cortez and by the Gila River watershed in its entirety. This broad landscape is uniquely positioned and bounded because it provides the area that most likely and most readily provides the greatest potential for understanding coastal-interior migrations. The landscape is between the two most viable routes for entry, population, and settlement of North America, within which viable indigenous cultures exist that maintain intimate and intact knowledge of origins, migrations, and homeland ecological knowledge. This broad landscape is treated as a thematic context within which the Chuckwalla Valley portion of the cultural landscape is articulated. The Chuckwalla Valley portion of the Pacific to Rio Grande Trail Landscape has been identified by the California Energy Commission (a California Environmental Quality Act [CEQA] lead agency) as a cultural landscape and historical resource, under CEQA, that has both archaeological and ethnographic contributing elements. The landscape appears to date from a presently undetermined point in prehistory through 1936, and includes archaeological sites and features, Traditional Cultural Properties, a complex trail system, springs, tanks, and wells, and culturally important plant and animal species. The combination of cultural and natural features that make up this composite resource qualify the resource as a type of cultural landscape.

- **Natural Resources.** Some natural resources of interest to Native Americans include but are not limited to: plants, animals, minerals, water, and natural settings. Natural resources can be used for food, medicine, totem, aesthetic or spiritual purposes. Ensuring the spiritual efficacy of plant, animal, or mineral products requires adherence to proper traditional techniques critical to the perpetuation of indigenous cultures.
    - **Plants.** Any native plant population may be of cultural interest to Native Americans. Culturally significant plants are often used for medicine, food, clothing, basketry, structures, totems, and aesthetic or ritual purposes.
    - **Animals.** Any native animal population may be of cultural interest to Native Americans, but they tend to be those that were traditionally used for medicine, food, clothing, totems, or ritual purposes.
    - **Minerals.** The kinds of mineral resources that might be of interest to Native Americans include clay (for pottery), salt, turquoise, obsidian, quartz crystals, and mineral pigments.
    - **Water.** Water is critical to all life forms, and is especially critical in the desert. This is a fact not lost on indigenous peoples of the desert; places with water are often also culturally important places. Water also plays an important role in the creation stories and histories of Indian tribes of the desert. Key issues associated with water include access, available amounts, quality, and plants and animals supported by the water. Some of the sources of water in the LUPA Decision Area include springs, seeps, tanks, lakes (wet and dry), and rivers. The Colorado River is considered to be especially important. In Native American understandings, the Colorado River is an earthly manifestation mirroring the great river in the night sky known as the Milky Way. Both the Colorado River and the Milky Way are also representations of the north–south orientation of the first migrations of the people, first from the world beyond, and second, into the physical world as the Creator led people to various new homelands of each group in Pai (Yuman) country.
    - **Natural Setting.** An important component of Native American natural aesthetics is the relationship between landforms, skies, and traditional practitioners. Local, intermediate, and distant horizons provide a palpable context within which natural and cultural resources are understood in culturally integrated ways.

III.10 PALEONTOLOGICAL RESOURCES

A paleontological resource is defined in the federal Paleontological Resources Preservation Act (PRPA) as the "fossilized remains, traces, or imprints of organisms, preserved in or on the earth's crust, that are of paleontological interest and that provide information about the history of life on earth" (16 United States Code [U.S.C.] 470aaa[1][c]). For the purpose of this analysis, a *significant* paleontological resource is considered to be of scientific interest, including most vertebrate fossil remains and traces, and certain rare or unusual invertebrate and plant fossils. A significant paleontological resource is considered to be scientifically important for one or more of the following reasons:

- The fossil extends the temporal (stratigraphic) or geographic distribution for a specific taxonomic group of fossils.
- It is a rare or previously unknown species.
- It represents an exceptionally high-quality, well-preserved and morphologically complete specimen.
- It preserves a previously unknown anatomical feature or exhibits other characteristic features which represent ontogenic, pathologic, or traumatic variations.
- It provides new information about the history of life on Earth.
- It has identified educational or recreational value.

Paleontological resources that may be considered *not* to have paleontological significance include those that lack provenance or context, lack physical integrity because of decay or natural erosion, or are overly redundant or otherwise not useful for academic research (Bureau of Land Management [BLM] Instruction Memorandum [IM] 2009-011; included in Appendix R2).

The intrinsic value of paleontological resources largely stems from the fact that fossils serve as the only direct evidence of prehistoric life. They are thus used to understand the history of life on Earth, the nature of past environments and climates, the biological membership and structure of ancient ecosystems, and the patterns and processes of organic evolution and extinction. Despite the tremendous volume of sedimentary rocks preserved worldwide and the enormous number of organisms that have lived during the vast expanse of geologic time, preservation of plant and animal remains as fossils is rare. Further, because of the infrequency of fossil preservation and the extinction of most fossilized species, fossils are considered nonrenewable resources. Once destroyed, a particular fossil can never be replaced. Essentially, paleontological resources include fossil remains and traces as well as the fossil-collecting localities and the geological rock units (e.g.,

formations) containing those localities. Knowing the geographic and topographic distribution of fossil-bearing rock units makes it possible to predict where fossils will, or will not, be encountered.

This chapter discusses applicable regulatory framework and the physical setting relevant to paleontological resources within the Desert Renewable Energy Conservation Plan (DRECP) area. The chapter provides site-specific details for individual ecoregion subareas and presents map data at a regional scale (1:750,000) commensurate with the programmatic nature of the Proposed LUPA. Appendix R1.10 includes 10 maps and 2 tables supporting this chapter. The maps illustrate fossil yield potential for the DRECP area, and the tables present the generalized Potential Fossil Yield Classification (PFYC) that goes with the maps. The PFYC developed for the entire DRECP area represents an estimate based on the available regional-scale geologic data; it is not meant to replace the project and site-specific identification and evaluation of potential paleontological resources. (See Section III.10.2, Baseline Inventory and Mapping Methodology.) Individual future renewable energy projects seeking approval from land management agencies would be required to evaluate paleontological resources at a project-level of detail and would need to use the most detailed geologic and paleontological data available as part of project-level assessments.

III.10.1 Regulatory Setting

This section identifies protections for paleontological resources as provided under regulations and applicable ordinances. In recognizing that paleontological resources include not only actual fossil remains and traces, but also the fossil-collecting localities and the geological formations containing those fossils, BLM established guidelines for evaluating the paleontological resource potential of individual geological rock units. This procedure, discussed more fully in Section III.10.1.3, Bureau of Land Management Plans and Guidelines, utilizes the PFYC to assign ranks to individual rock units. The BLM has also developed standards for the assessment and mitigation of impacts of BLM management actions on paleontological resources (BLM IM 2008-009; 2009-011).

III.10.1.1 Federal Regulations

The management and preservation of paleontological resources on public lands are governed under various laws, regulations, and standards, including the Paleontological Resources Preservation Act summarized in this section. Additional statutes for management and protection include the Federal Land Policy and Management Act (Public Law 94–579, codified at 43 U.S.C. 1701–1782 and 18 U.S.C. 641), which penalizes the theft or degradation of property of the U.S. Government. Other federal acts—the Federal Cave Resources Protection Act (16 U.S.C. 4301 et seq.) and the Archaeological Resources Protection Act (16 U.S.C. 470 et seq.)—protect fossils found in significant caves or in association with archeological resources. The BLM has also developed general procedural

guidelines (Manual H-8720-1; IM 2008-009; IM 2009-011) for the management of paleontological resources.

Paleontological Resources Preservation, Omnibus Public Land Management Act, Public Law 111-011, Title VI, Subtitle D. The Omnibus Public Land Management Act, Paleontological Resource Preservation Subtitle (16 U.S.C. 470aaa et seq.), directs the secretaries of the Department of the Interior and the Department of Agriculture to manage and protect paleontological resources on federal land using scientific principles and expertise. (This act is known by its common names, the Omnibus Act or the Paleontological Resources Preservation Act.) The Paleontological Resources Preservation Act incorporates most of the recommendations of the report of the Secretary of the Interior titled "Assessment of Fossil Management on Federal and Indian Lands" to formulate a consistent paleontological resources management framework. In passing the Paleontological Resources Preservation Act, the U.S. Congress officially recognized the scientific importance of paleontological resources on some federal lands by declaring that fossils from these lands are federal property that must be preserved and protected. The act codifies existing policies of BLM, National Park Service, U.S. Forest Service, Bureau of Reclamation, and the U.S. Fish and Wildlife Service, and provides:

- Uniform criminal and civil penalties for illegal sale and transport, theft, and vandalism of fossils from federal lands.
- Uniform minimum requirements for paleontological resource-use permit issuance (terms, conditions, and qualifications of applicants).
- Uniform definitions for "paleontological resources" and "casual collecting."
- Uniform requirements for curation of federal fossils in approved repositories.

Federal legislative protections for scientifically significant fossils apply to projects that take place on federal lands (with certain exceptions, such as the Department of Defense, which continue to protect paleontological resources under the Antiquities Act). Such protections involve federal funding, require a federal permit, or involve crossing state lines.

Antiquities Act of 1906 (16 U.S.C. 431-433). The Antiquities Act of 1906 states, in part:

> Any person who shall appropriate, excavate, injure or destroy any historic or prehistoric ruin or monument, or any object of antiquity, situated on lands owned or controlled by the Government of the United States, without the permission of the Secretary of the Department of the Government having jurisdiction over the lands on which said antiquities are situated, shall upon conviction, be fined in a sum of not more than five hundred dollars or be

> imprisoned for a period of not more than 90 days, or shall suffer both fine and imprisonment, in the discretion of the court.

Although there is no specific mention of natural or paleontological resources in the Antiquities Act, or in the act's uniform rules and regulations (43 Code of Federal Regulations [CFR] 3), "objects of antiquity" has been interpreted by the National Park Service, BLM, the U.S. Fish and Wildlife Service, and other federal agencies to include fossils. Permits to collect fossils on lands administered by federal agencies are authorized under this act. Therefore, projects involving federal lands will require permits for both paleontological resource evaluation and mitigation efforts.

Archaeological and Paleontological Salvage (23 U.S.C. 305). Statute 23 U.S.C. 305 amends the Antiquities Act of 1906. Specifically, it states:

> Funds authorized to be appropriated to carry out this title to the extent approved as necessary, by the highway department of any State, may be used for archaeological and paleontological salvage in that state in compliance with the Act entitled "An Act for the preservation of American Antiquities," approved June 8, 1906 (PL 59-209; 16 U.S.C. 431-433), and State laws where applicable.

This statute allows funding for mitigation of paleontological resources recovered pursuant to federal aid highway projects, provided that "excavated objects and information are to be used for public purposes without private gain to any individual or organization" (Federal Register 46[19]; 9570).

National Registry of Natural Landmarks (16 U.S.C. 461-467). The National Natural Landmarks Program, established in 1962, is administered under the Historic Sites Act of 1935. Regulations were published in 1980 under 36 CFR 1212 and the program was re-designated as 36 CFR 62 in 1981. A National Natural Landmark is defined as:

> ... an area designated by the Secretary of the Interior as being of national significance to the United States because it is an outstanding example(s) of major biological and geological features found within the boundaries of the United States or its Territories or on the Outer Continental Shelf (36 CFR 62.2).

National significance describes:

> ... an area that is one of the best examples of a biological community or geological feature within a natural region of the United States, including terrestrial communities, landforms, geological features and processes,

habitats of native plant and animal species, or fossil evidence of the development of life (36 CFR 62.2).

Federal agencies and their agents should consider the existence and location of designated National Natural Landmarks, and of areas found to meet the criteria for national significance, in assessing the effects of their activities on the environment under Section 102(2)(c) of the National Environmental Policy Act (42 U.S.C. 4321). The National Park Service is responsible for providing requested information about the National Natural Landmarks Program for these assessments (36 CFR 62.6[f]). However, other than consideration under the National Environmental Policy Act, National Natural Landmarks are afforded no special protection. Furthermore, there is no requirement to evaluate a paleontological resource for listing as a National Natural Landmark. Finally, project proponents (state and local) are not obligated to prepare an application for listing potential National Natural Landmarks, should such a resource be encountered during project planning and delivery.

Examples of geological and paleontological National Natural Landmarks in or near the DRECP area include:

- ***Imperial Sand Hills:*** Imperial Sand Hills is one of the largest dune patches in the United States. It is an outstanding example of dune geology and ecology in an arid land (Designated: 1966. Ownership: federal, private).
- ***Eureka Dunes:*** Eureka Dunes, located within Death Valley National Park, is an excellent example of Aeolian (wind) geological processes. It is the tallest dune complex in the Great Basin biophysiographic province. The site contains an endangered grass genus, one species of which is the only plant capable of surviving on and stabilizing the steep dune slopes (Designated: 1983. Ownership: federal).
- ***Amboy Crater:*** Amboy Crater is an excellent example of a recent volcanic cinder cone with an unusually flat crater floor (Designated: 1973. Ownership: federal, private).
- ***Rainbow Basin:*** Comprising deep erosion canyons with rugged rims, Rainbow Basin is an outstanding example of geologic processes. The site also contains significant fossil remains and traces (e.g., footprints) of Miocene plants, insects, and land mammals (Designated: 1966. Ownership: federal).

National Historic Preservation Act of 1966 (National Historic Preservation Act; 16 U.S.C. 470). Section 106 of the National Historic Preservation Act does not apply to paleontological resources unless the paleontological specimens are found in culturally related contexts (e.g., fossil shell included as a mortuary offering in a burial or a culturally related site such as petrified wood locale used as a chipped stone quarry). In such instances, the materials are considered cultural resources and are treated in the manner

prescribed for the site in question. Mitigation is then almost exclusively limited to sites determined eligible for, or listed on, the National Register of Historic Places. Cooperation between the cultural resource and paleontological disciplines is expected in such instances.

III.10.1.2 BLM Plans and Guidelines

BLM Manuals, Handbooks, and Instruction Memoranda. BLM Manual 8270 and BLM Handbook H-8270-1 contain BLM's policy and guidance for the management of paleontological resources on public lands. The manual has more information on the authorities and regulations related to paleontological resources. The handbook gives procedures for permit issuance, requirements for qualified applicants, and information on paleontology and planning. The classification system for potential fossil-bearing geologic formations on public lands in the handbook has been revised and replaced by the PFYC, as discussed in this section.

The manual and handbook will be revised after the new regulations (currently being developed and reviewed) are promulgated under the PRPA. Until that time, BLM will continue to follow the policy and guidelines in the manual and handbook that are not superseded by the PRPA. The BLM's overarching guidance for paleontological resources is that locating, evaluating, and classifying paleontological resources and developing management strategies for them must be based on the best scientific information available. Management of paleontological resources should emphasize:

- The uniqueness of fossils.
- Their usefulness in deciphering ancient and modern ecosystems.
- The public benefits and public expectations arising from their scientific, recreational, and educational values.
- The BLM's interest in and need for the continued advancement of the science of paleontology.
- The importance of minimizing resource conflicts within a multiple use framework.

PFYC. On October 15, 2007, with the release of IM 2008-009, BLM formalized a new classification system for identifying fossil potential on public lands. This classification system is based on the presence of significant paleontological resources in a geologic unit and its potential risk for impacts to the resource. It is a broad approach to planning efforts and an intermediate step in evaluating specific projects. IM 2008-009 will be incorporated into the next update of BLM Handbook H-8270-1, General Procedural Guidance for Paleontological Resource Management.

Using the PFYC system, geologic units are classified as Class 1 (very low) through Class 5 (very high), based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts. A higher class number indicates a higher potential for adverse environmental impacts. This system is used to set management policies and is not intended to apply to specific paleontological localities or small areas within geologic units. Table III.10-1 defines each class and recommended management actions.

Table III.10-1
Potential Fossil Yield Classification System Class Definitions (BLM)

Class	Definition
Class 1 (very low)	Geologic units not likely to contain recognizable fossil remains. Management concern is negligible or not applicable; and assessment or mitigation requirements are usually not necessary, with the exception of isolated circumstances.
Class 2 (low)	Sedimentary geologic units not likely to contain vertebrate fossils or significant nonvertebrate fossils. Management concern is generally low; and assessment of mitigation is usually not necessary, with the exception of isolated circumstances.
Class 3 (moderate or unknown)	Fossil-bearing sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence, or units of unknown fossil potential. Management concern is moderate or cannot be determined from existing data. Ground-disturbing activities may require field assessment to determine the appropriate course of action.
Class 3a (moderate potential)	Units are known to contain vertebrate fossils or scientifically significant nonvertebrate fossils, but these occurrences are widely scattered. Common invertebrate or plant fossils may be found in the area, and opportunities may exist for hobby collecting. The potential for a project to be sited on or impact a significant fossil locality is low but somewhat higher for common fossils.
Class 3b (unknown potential)	Units exhibit geologic features and preservational conditions that suggest significant fossils could be present, but little information about the paleontological resources of the unit or the area is known. This may indicate the unit or area is poorly studied, and field surveys may uncover significant finds. The units in this class may eventually be placed in another class when sufficient surveys and research are performed. The unknown potential of the units in this class should be carefully considered when developing any mitigation or management actions.
Class 4 (high)	Geologic units containing a high occurrence of significant fossils. The probability for impacting significant paleontological resources is moderate to high and depends on the proposed action. Anticipated impacts to significant fossils would usually require a field survey, followed by on-site paleontological monitoring or spot-checking.

Table III.10-1
Potential Fossil Yield Classification System Class Definitions (BLM)

Class	Definition
Class 5 (very high)	Fossil-rich geologic units that regularly produce vertebrate fossils or significant nonvertebrate fossils at risk of natural degradation or human-caused adverse impacts. The probability of impacting significant fossils is high, and fossils are known or can reasonably be expected to occur in the impacted area. Anticipated impacts to significant fossils would usually require a field survey, followed by on-site paleontological monitoring or spot-checking.

Assessment and Mitigation of Potential Impacts to Paleontological Resources. On October 10, 2008, BLM introduced guidelines for assessing potential impacts to paleontological resources to determine mitigation steps for federal actions on public lands covered under both the Federal Lands Policy and Management Act of 1976 and the National Environmental Policy Act (IM 2009-011). This IM provides field survey and monitoring procedures to help minimize impacts to paleontological resources in cases where a federal action could adversely affect significant paleontological resources.

These assessment and mitigation guidelines show the conditions under which no specific paleontology assessment is required, including when:

1. A project will only affect geologic units unlikely to contain significant fossils or that have a very low or low potential for significant fossils (i.e., PFYC Class 1 or 2).
2. No scientifically important localities are identified in the area.

However, pre-project field surveys, a paleontological monitoring program, or other mitigation measures may be needed if a project would disturb geologic units assigned PFYC classes 3, 4, or 5, possible fossil-bearing alluvium, or known significant localities. The BLM guidelines also outline procedures for conducting field surveys and monitoring on-site surface-disturbing activities. Assessment and mitigation guidelines are described in Volume IV, Chapter IV.10, Paleontological Resources.

III.10.2 Baseline Inventory and Mapping Methodology

Due to the immensity of the DRECP area and the wide variety of its landscapes and rock units, the most useful means of approximating the potential fossil yields in ecoregion subareas is by using geologic rock distributions in published reports. The distribution of paleontological resources is directly linked to the distribution of the geologic rocks preserving those resources. The BLM's PFYC system (described in Section III.10.1.3) utilizes this approach by assigning a specific PFYC ranking to individual rock units.

To support the analysis of impacts to paleontological resources in Chapter IV.10, a regional baseline inventory of the fossil yield potential of geologic rock within the DRECP area was developed. The regional scale of the geologic data used (1:750,000) means that the inventory is useful only in initial constraints analysis and for providing a general comparison of potential paleontological resource effects among alternatives. Assignment of geologic groups to various PFYC classes does not indicate where fossils may or may not be found, but rather suggests areas where the potential yield is higher relative to other locations assigned to lower PFYC classes.

As indicated in Table R1.10-1 (in Appendix R1) and in Figure III.10-1, a large body of geologic data is produced at various scales, to different extents, and with different formats to provide the baseline geologic data that determine PFYC classes. This environmental impact statement (EIS) relies upon the *2010 Geologic Map of California*, which is an updated and much improved version of a 1977 map, to identify potential fossil-yielding potential. It presents the geology of the DRECP area at a 1:750,000 scale (California Geological Survey 2013). The original map had accuracy errors that have been corrected. Data in the old version did not differentiate between Quaternary-age geologic units. In the 2010 version, older Pleistocene-age units are now differentiated from younger Holocene-age units. This distinction is important from a paleontological resources perspective because of the greater potential for Pleistocene deposits to contain fossil remains.

Relevant BLM guidance documents (IM 2008-009 and IM 2009-011), in combination with results from a comprehensive literature search of existing geologic and paleontological conditions in the DRECP area, were used to assign PFYC classes to the geologic rock units on the statewide map. Figure III.10-2 shows the PFYC ranking of rock units in each ecoregion subarea, and Table R1.10-2 (in Appendix R1) presents each geologic unit and its estimated PFYC class. The challenge with using statewide data is that some of the criteria for assigning PFYC classes require local, site-specific knowledge of individual geologic formations to assess their exposure to impacts. For example, because the higher PFYC classes are typically represented by individual geologic formations or stratigraphic layers within a formation, it would be misleading to classify a geologic rock unit at the 1:750,000 scale as PFYC Class 5. In addition, some rock units may predominantly belong to one PFYC class, while an individual formation or stratigraphic layer within that unit may be unusually fossil rich.

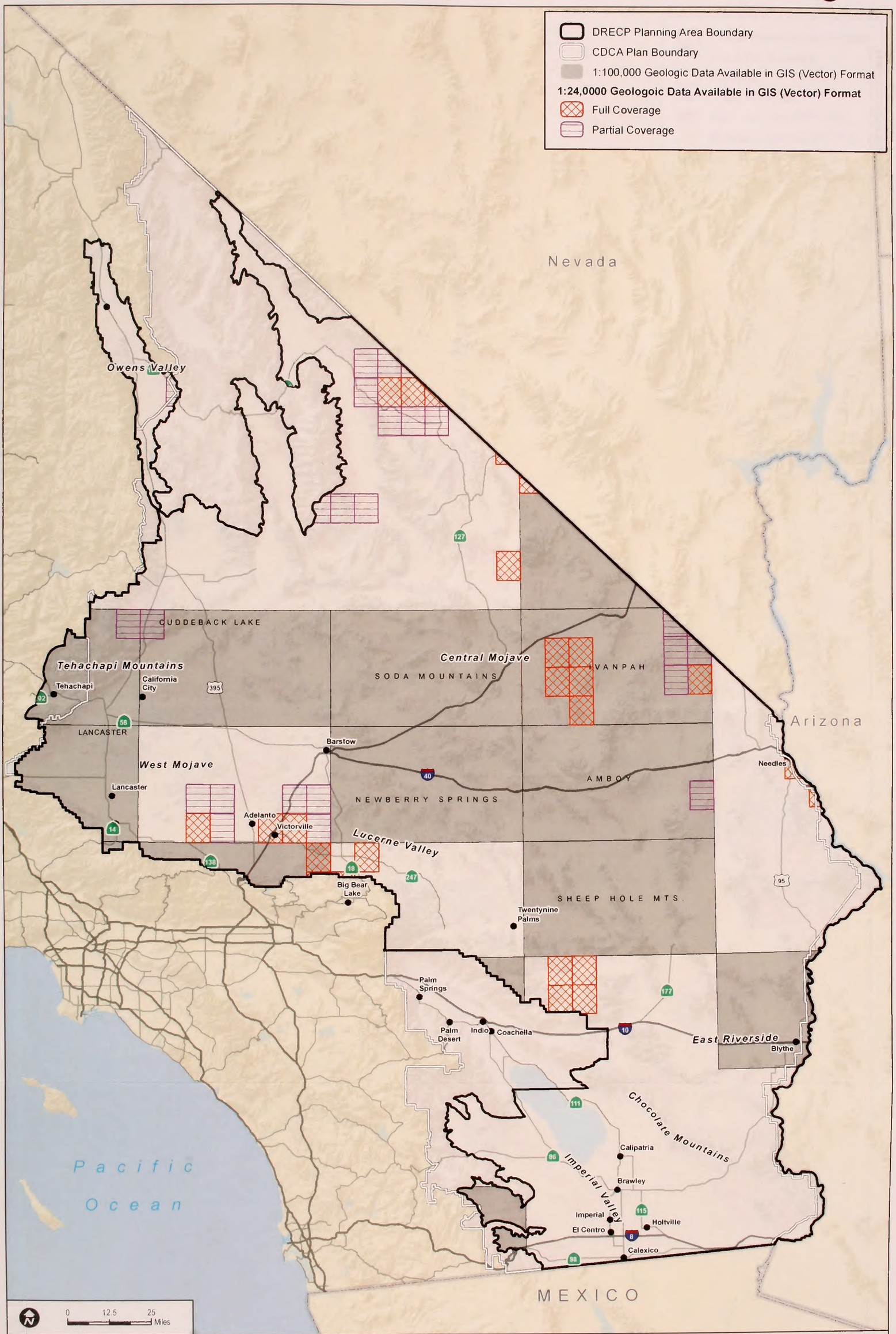
Because the geologic rock units at the 1:750,000 scale are so generalized, the PFYC classes are estimates and generalized in the same manner as shown in BLM IM 2009-011, Attachment 2, Paleontological Resources Assessment Flowchart. PFYC classes were grouped into three categories based on the level of management concern and the types of assessment and mitigation actions that could be required:

- **Low/Very Low:** Consists of PFYC Classes 1 and 2. Management concern is low, and assessment and mitigation is required only in rare circumstances. Even in those cases,

the estimated PFYC must be confirmed at a local level, and it must be demonstrated that no known paleontological localities exist within the paleontological Area of Potential Effect (e.g., record search, literature review).

- **Moderate/Unknown:** Consists of PFYC Class 3. Management concern is either moderate or cannot be determined from existing data. A written assessment would be required; and, depending upon the potential for impacts, a paleontological field survey and report would be needed. Further action, including project redesign and or a monitoring and mitigation plan, may be required depending on the results of the written assessment and field survey. Areas of unknown potential may be reassigned to a different PFYC class after further investigation.
- **High/Very High:** Consists of PFYC Classes 4 and 5. Management concern is high to very high. The probability of impacting significant paleontological resources is moderate to high, depending on the proposed action (i.e., extent and depth of disturbance). A field survey by a qualified paleontologist is probably needed to assess local conditions, and special management actions may be required.

The assignment of Quaternary units to PFYC classes was conservative, in recognition that numerous fossil discoveries have been made in areas where previous information and mapping suggested low paleontological potential. For example, although the PFYC system suggests assigning rock units younger than 10,000 years, as well as sand dune deposits, to PFYC Class 2, they were assigned Class 3 because these rock units can be thin and overlie older, more sensitive rock units. The modified PFYC used here includes some ranges because their rock units, although predominantly belonging to one class, could locally belong to a higher class. In assigning geologic rock units to ranges of sensitivity (Low/Very Low, Moderate/Unknown, or High/Very High), the higher class was used.

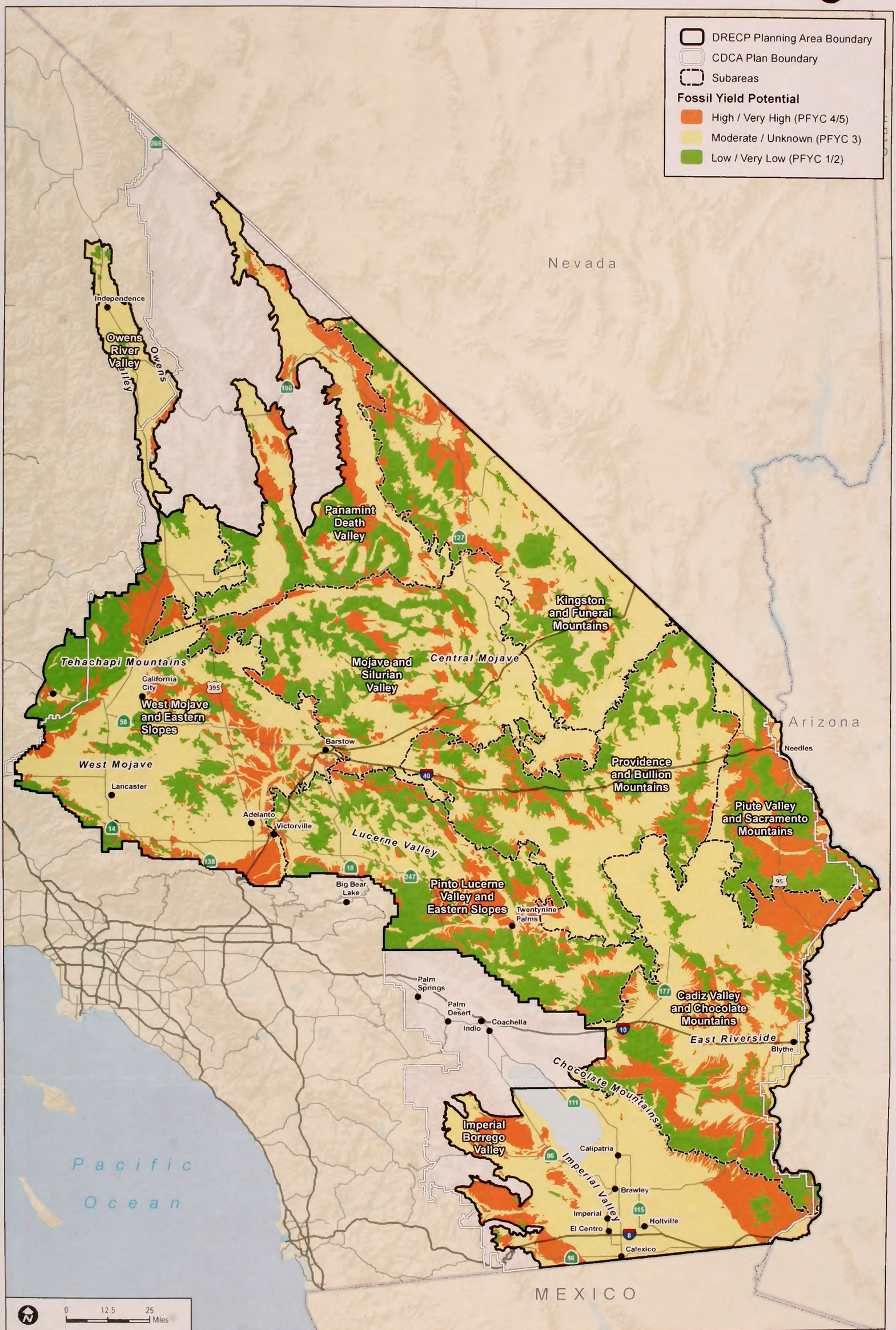


Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); CA Department of Geology (2010)

FIGURE III.10-1

Index of Detailed Geologic Mapping Available in GIS (vector) Format

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Sources: ESRI (2015); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); CA Department of Geology (2010)

FIGURE III.10-2

Potential Fossil Yield Classification of Geology - Subarea Index Map

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III.10.3 Overview of Paleontological Resources Within the DRECP Area

Statewide data regarding paleontological resources are reported in assorted publications, some of which compile various faunal lists for specific formations or periods. For example, paleontological resources inventories have been completed for National Park Service-administered lands within the DRECP area (Santucci et al. 2004). It is virtually impossible to digitally represent the full extent of buried paleontological fossil distribution. Fossils are normally underground, out of sight, and not easy to locate other than by direct observation either after erosion or during excavation. The likelihood of encountering subsurface paleontological resources in many of the southwestern valleys is not well known for several reasons. The land consists of mostly flat-lying sediments, thus natural erosion cuts through the sediments but does not penetrate deeply except in major stream channels, so the prior existence of subsurface and at-depth fossils is not readily determinable. Paleontology studies have focused on natural erosion in the surrounding hills and badlands where fossil exposures may be abundant in arroyo cuts and rain-washed hillsides.

Past and present discretionary projects proposed within the DRECP area have required varying degrees of baseline information on paleontological resources to be collected to support the analysis of paleontological resource impacts for specific projects, as required by the National Environmental Policy Act. Site-specific mapping of fossil yield potential and mitigation implementation, where deemed necessary, has provided important knowledge about the presence, distribution, and importance of fossil resources within the DRECP area. Such information, however, is generally scarce, highly localized, and specific to individual geologic formations. Furthermore, previous mitigation reports of existing developments in the flat-lying areas are not well indexed for convenient public access; they often exist only in BLM or other local repository offices. Some peer-reviewed publications are also describing fossil finds, especially by museums performing mitigation. Projects requiring assessment of and impact mitigation to paleontological resources within the undeveloped desert landscape have been few and far between, though they are generally located near transportation corridors and energy infrastructure.

III.10.3.1 Summary of Paleontological Resources Known in the DRECP Area

Since the late nineteenth century, geologists and paleontologists have been exploring exposed rock outcrops in Southern California's Mojave and Colorado desert regions; in the process they have discovered and documented a rich fossil record extending back to at least the middle Proterozoic Eon, about 1.2 billion years ago. The oldest fossils (~990 mega-annum [Ma], or 990 million years ago) from the DRECP area consist of microscopic single-celled bacteria and algae preserved in marine sedimentary rocks exposed in the

Nopah Range, in the Kingston and Funeral Mountains ecoregion subarea. Younger fossils from the same area, approximately 600 million years old, are among the oldest examples of metazoan animals identified in the western United States. Farther west in the DRECP area, marine limestones exposed in the Providence Mountains and Marble Mountains, in the Providence and Bullion Mountains ecoregion subarea, preserve fossils of Early Cambrian age (~540 to 500 Ma) that document the dramatic increase in biological diversity at the beginning of the Paleozoic Era. These fossils include hard skeletal remains of coral-like archaeocyathids, primitive brachiopods, and trilobites. Younger Paleozoic (~541 to 252.2 Ma) strata exposed in the Providence Mountains and surrounding mountain ranges preserve marine invertebrate fossils (e.g., tabulate corals, brachiopods, gastropods, trilobites, and crinoids) of Ordovician (~485 to 444 Ma), Devonian (~419 to 359 Ma), Carboniferous (~359 to 299 Ma), and Permian (~299 to 252 Ma) age. These fossils document the existence of a relatively passive continental margin along the west coast of North America that persisted for almost 250 million years before plate tectonic movements near the Paleozoic-Mesozoic boundary (~250 Ma) transformed the continental margin into an area of active plate subduction. Igneous and volcanic arcs extending nearly the full length of the continent came with this transformation.

In contrast to the regional Paleozoic fossil record, the fossil record for the Mesozoic Era (~252 to 65 Ma) is poorly preserved in rocks exposed in the DRECP area. This is largely because most regional Mesozoic Era rocks are igneous and consist of either plutonic rocks (e.g., granite, granodiorite, or gabbro) or volcanic rocks (e.g., rhyolite, dacite, or basalt), which—based on their origin directly from molten magma—are devoid of fossil remains or traces. The few examples of Mesozoic Era sedimentary rocks, for the most part, have been altered by metamorphic processes that have destroyed their original fossil content. There are, however, a few notable exceptions, including the existence of the only known dinosaur footprints in California, preserved in Jurassic Period (~165 to 145 Ma) sedimentary rocks exposed in the Mescal Range, which is in the Kingston and Funeral Mountains ecoregion subarea.

The fossil record for the Cenozoic Era (~65 Ma to the present) is very well preserved in exposed sedimentary rocks within the DRECP area. Examples include the only known Paleocene (~60 Ma) land mammal assemblage from the western United States, which has been collected from rocks in the El Paso Mountains in the Panamint Death Valley ecoregion subarea. Important early Miocene (~23 to 19 Ma) terrestrial vertebrate fossils have been recovered from sites near Boron and in the Kramer Hills in the West Mojave and Eastern Slopes ecoregion subarea, while the North American standard for middle Miocene (~19 to 13 Ma) land mammal assemblages has been well documented in studies of numerous paleontological sites in the Gravel Hills, Mud Hills, and Alvord Mountains, located in the Mojave and Silurian Valley ecoregion subarea. Important tropical marine

invertebrate and vertebrate fossil faunas document the formation of the proto-Gulf of California and the initiation of Colorado River delta deposition during the late Miocene Epoch and early Pliocene Epoch (~6 to 5 Ma). These fossils are well preserved in rocks of the western Salton Trough in the Imperial Borrego Valley ecoregion subarea. Slightly younger nonmarine strata exposed near Borrego Springs, in the Imperial Borrego Valley ecoregion subarea, preserve the most continuous record of early Pliocene through middle Pleistocene (~5 to 1.8 Ma) land mammals in North America. An extensive record of late Pleistocene (~750 to 7 kilo-annum) pluvial lake, stream, and alluvial fan fossil biotas has been recovered from the northern valleys of the DRECP area (Owens Valley, Panamint Valley, and Death Valley). The Pleistocene fossils collected from the playa-filled valleys of the Mojave Desert and Salton Trough document the dramatic climatic fluctuations that characterized the transition from glacial conditions of the late Pleistocene to the modern period.

Numerous technical reports summarizing the results of regional paleontological resource assessment and mitigation studies for renewable energy projects already built or planned in the DRECP area, contain important information on paleontological resources. Section III.10.4 discusses the information contained in these both published and unpublished reports and examines paleontological resources for each ecoregion subarea in the DRECP area.

III.10.3.2 Overview of Generalized PFYC Results

The results of the PFYC mapping, described in Section III.10.2, should be viewed as both a generalization and an estimate given the "bird's eye view" at which the classification was developed, even if it is a reasonably accurate portrayal of the relative differences among rock units and their significant yield potentials. Table R1.10-2 (in Appendix R1) lists the proposed modified PFYC classes for each of the geologic units represented in the DRECP area. The table lists the rock units in approximately stratigraphic order (i.e., youngest to oldest). The "PTYPE" field corresponds to the geologic unit symbol as shown in Figures R1.10-1 through R1.10-10. Figures R1.10-1 though R1.10.10 show the distribution of the three generalized categories of paleontological potential, by ecoregion subarea.

Exhibit III.10-1 shows the approximate distribution of PFYC classes within the DRECP area. The DRECP area is predominantly assigned an estimated/generalized PFYC class of Moderate/Unknown (53%), in large part because geologic unit "Q," which is the most extensive geologic unit, was classified as PFYC 3. Unit "Q"—which refers to *Pleistocene/Holocene marine and nonmarine (continental) sedimentary rocks*—encompasses a wide range of Quaternary units that are predominantly Holocene. In reality, most areas within Unit "Q" could likely be assigned a PFYC Class 2 if more detailed mapping confirms the area is underlain by nonsensitive units. However, because Unit "Q" could locally include Pleistocene-age or otherwise sensitive units (e.g., where such units occur in slivers or patches too small to delineate), it was assigned to Class 3 rather than Class 2.

Approximately 18% of the DRECP area is underlain by rock units estimated to have a High/Very High PFYC class; these generally include mapped Pleistocene-age and Cenozoic-age rock units, as discussed in the following sections.

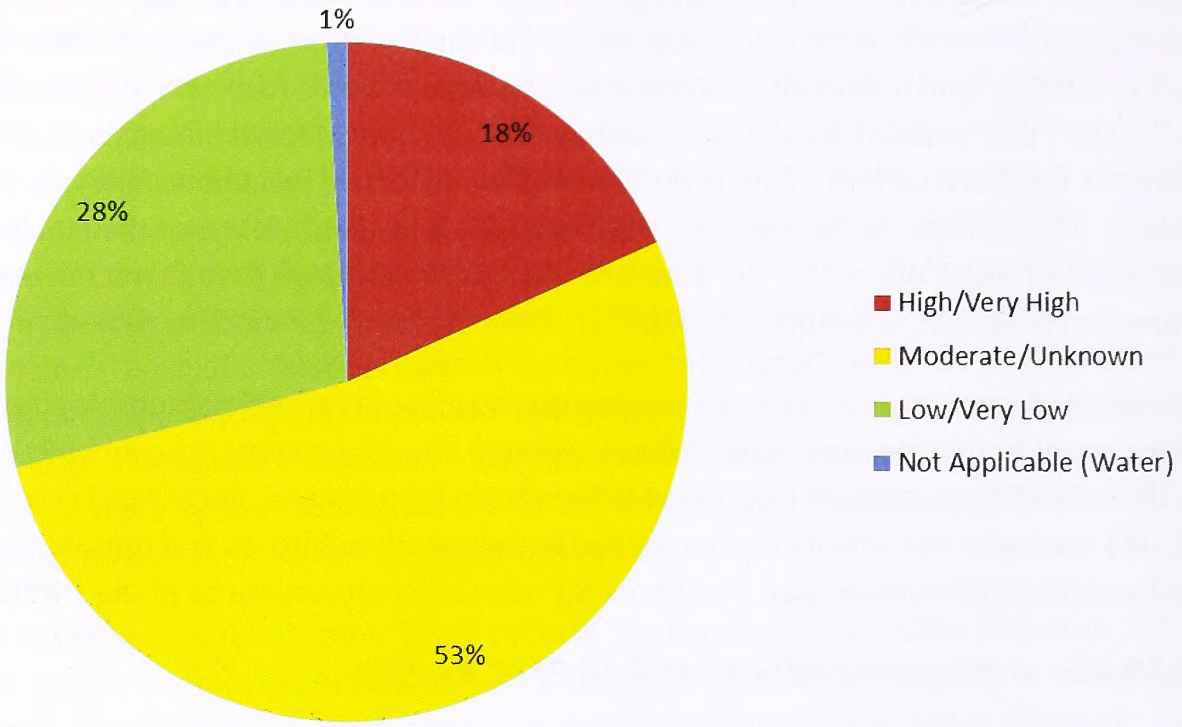


Exhibit III.10-1 Distribution of Estimated Fossil Yield Potential in the DRECP Area

III.10.4 Paleontological Resources by Ecoregion Subarea

This section discusses the geologic setting and fossil occurrences within the DRECP area, by ecoregion subarea. Table III.10-2 shows the area assigned to various levels of fossil-yielding potential (Low/Very Low, Moderate/Unknown, and High/Very High) within each ecoregion subarea, and Exhibit III.10-2 illustrates the relative amount of land within each ecoregion subarea assigned to various levels of sensitivity. The distribution of paleontological potential is fairly uniform across ecoregion subareas, though some ecoregion subareas—such as the Imperial Borrego Valley, the Cadiz Valley and Chocolate Mountains, and the West Mojave and Eastern Slopes—have a slightly higher amount of paleontologically sensitive areas compared with other ecoregion subareas.

III.10.4.1 Cadiz Valley and Chocolate Mountains Ecoregion Subarea

The BLM has designated Areas of Critical Environmental Concern (ACECs) on BLM-administered lands that contain exceptional paleontological resources. ACECs with paleontological value in this ecoregion subarea include the Mule Mountains ACEC and the Upper McCoy ACEC.

Table III.10-2
Generalized PFYC Acres by Ecoregion Subarea

Ecoregion Subarea	Not Applicable (Water)	Low/Very Low	Moderate/ Unknown	High/ Very High	Total
Cadiz Valley and Chocolate Mountains	15,000	675,000	1,578,000	795,000	3,064,000
Imperial Borrego Valley	184,000	66,000	1,597,000	553,000	2,400,000
Kingston and Funeral Mountains		782,000	1,391,000	297,000	2,470,000
Mojave and Silurian Valley	20	818,000	1,431,000	395,000	2,644,000
Owens River Valley	3,000	34,000	363,000	17,000	418,000
Panamint Death Valley	500	516,000	1,006,000	415,000	1,937,000
Pinto Lucerne Valley and Eastern Slopes		1,076,000	852,000	391,000	2,319,000
Piute Valley and Sacramento Mountains	13,000	480,000	249,000	350,000	1,092,000
Providence and Bullion Mountains	40	991,000	1,340,000	284,000	2,615,000
West Mojave and Eastern Slopes	800	903,000	2,102,000	620,000	3,626,000
Total	**217,000**	**6,343,000**	**11,909,000**	**4,116,000**	**22,584,000**

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Fossils known from this ecoregion subarea are limited. The oldest reported fossils are poorly preserved remains of Paleozoic marine invertebrates (e.g., crinoids) from metasedimentary (a sedimentary rock that shows evidence of metamorphism) rocks (e.g., marbles, dolostones, and quartzites) exposed in the Big Maria Mountains and Little Maria Mountains. Mesozoic-age (~120 Ma) metasedimentary rocks in the McCoy Mountains have produced mineralized angiosperm wood that has been critical in establishing the Cretaceous age of the enigmatic McCoy Mountains Formation. Cenozoic fossils are also sparse in this ecoregion subarea, with known occurrences confined to Pliocene and Quaternary rock units. Erosional remnants of the Pliocene (~5 to 3 Ma) Bouse Formation occur along portions of the Colorado River

drainage including areas on the flanks of the Big Maria Mountains and the Palo Verde Mountains. The Bouse Formation has produced estuarine and marine invertebrate fossils (e.g., foraminifera, gastropods, bivalves, and ostracods) that provide critical evidence for understanding when the ancestral Colorado River started to flow westward into the proto-Gulf of California. Younger, sparsely fossil-bearing, Plio-Pleistocene lacustrine deposits in Palo Verde Valley and Chuckwalla Valley may also play a role in resolving current conflicts about the history of the Colorado River and uplift of the Colorado Plateau.

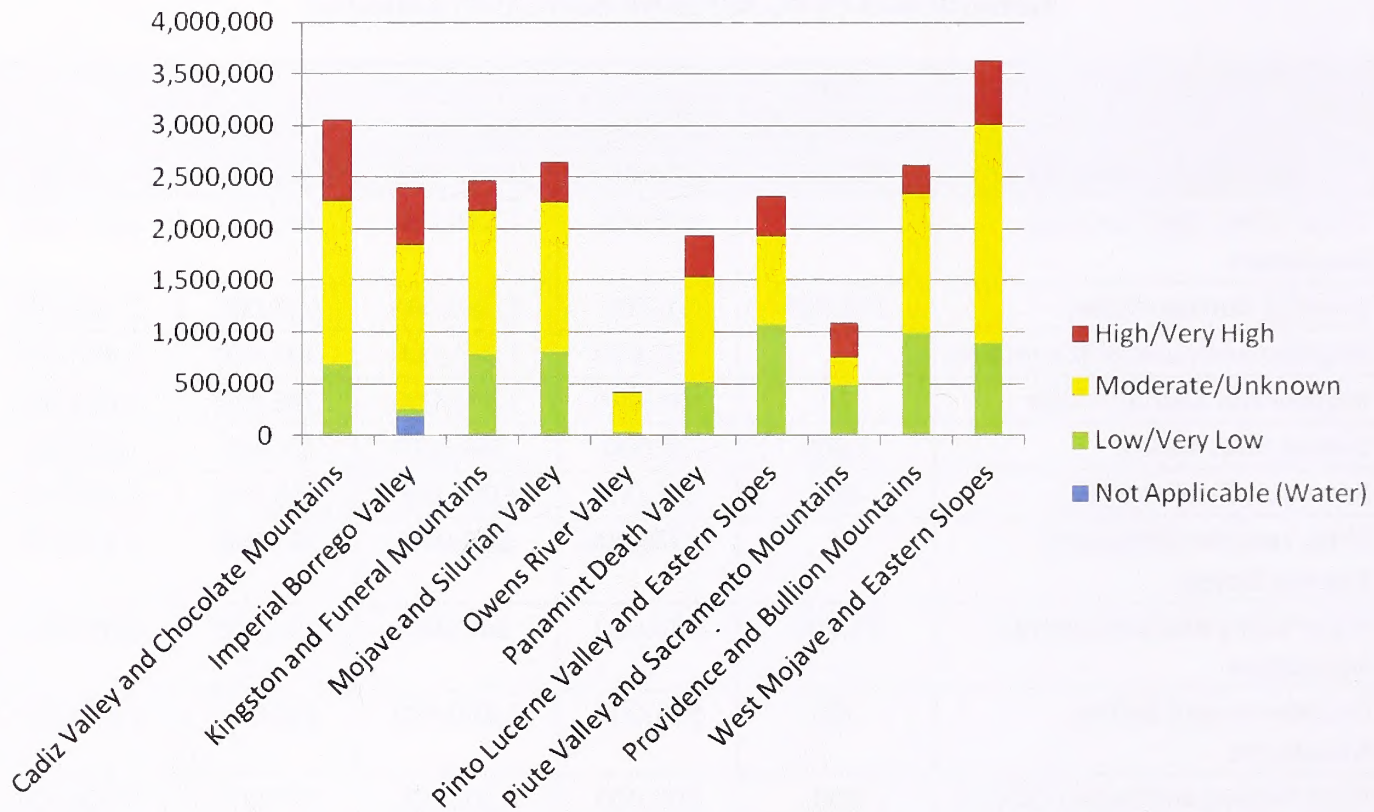


Exhibit III.10-2 Potential Fossil Yield Classification of Geology in the DRECP Area

Recent fieldwork related to renewable energy resources in the Palo Verde Valley has resulted in the discovery of vertebrate fossils in buried Pleistocene paleosols interbedded with alluvial fan deposits tentatively assigned to the Chemehuevi Formation. The paleosols are widespread and extend for at least 13 miles in some places. Preliminary radiocarbon dating suggests an age of ~13 kilo-annum (or 13,000 years ago) for the paleosols and contained fossil remains, which currently include bones of tortoises, rabbits, horses, and unidentified proboscideans (Stewart et al. 2012). Field investigation associated with a proposed power tower development west of Blythe identified several rare, unique, and well-preserved specimens. For example, one of the fossil discoveries included a clutch of unhatched desert tortoise eggs intact in a burrow accompanied by an adult tortoise—the specimen may be the only such fossil ever found in California.

Pleistocene lacustrine deposits occur in several of the larger valleys in this ecoregion subarea including Cadiz Lake in Cadiz Valley, Troy Lake in Mojave Valley, and Danby Lake in Ward Valley. At the Archer site in the Cadiz dry lake beds, fossil remains of Pleistocene amphibians, reptiles, birds, and mammals (mostly rodents) have been collected, while a more diverse Ice Age vertebrate assemblage consisting of rabbits, rodents, foxes, horses, and camels has been recovered from slightly younger lake beds at the Saltmarsh site in the Danby dry lake beds.

III.10.4.2 Imperial Borrego Valley Ecoregion Subarea

The BLM has designated ACECs on BLM-administered lands that contain exceptional paleontological resources. ACECs with paleontological value in this ecoregion subarea include the following:

- Coyote Mountains Fossil Site
- Ocotillo
- Lake Cahuilla
- West Mesa
- Yuha Basin

Fossils from this ecoregion subarea are primarily from the Borrego Valley, Vallecito Valley, Carrizo Badlands, and Yuha Basin. They generally consist of:

- Late Miocene to early Pliocene (~6 to 4 Ma) marine invertebrate fossils (e.g., corals, oysters, scallops, clams, snails, crabs, shrimp, sand dollars, and sea urchins) from strata of the Imperial Group, as well as Pliocene to early Pleistocene (~4 to 1.5 Ma).
- Terrestrial vertebrate fossils (e.g., shrews, moles, bats, ground sloths, rabbits, rodents, dogs, wolves, coyotes, foxes, short-faced bears, cave bears, raccoons, coatis, weasels, skunks, jaguars, bobcats, saber-toothed cats, mammoths, horses, tapirs, peccaries, camels, llamas, deer, and antelopes).
- Paleofloras (e.g., juniper, avocado, bay laurel, cottonwood, willow, ash, walnut, buckeye, and fan palm) from sedimentary rocks of the Palm Spring Group.

Pleistocene (~1 Ma) fossils from lacustrine siltstones and fine-grained sandstones of the Brawley Formation have also been found within this ecoregion subarea. They include well-preserved remains of freshwater mollusks (e.g., mussels, clams, and snails) and freshwater vertebrates (e.g., fish) that lived in a large, perennial lake fed by freshwater flowing north into the Salton Trough via the ancestral Colorado River.

During the latest Pleistocene and lasting almost into modern times, the Colorado River continued to alternate its flow between the Colorado River delta to the south and the Salton Trough to the north. During the times it flowed north, the full discharge of the Colorado River formed a large, freshwater lake that at maximum inundation was approximately 300 feet deep, 105 miles long, and at its widest point, some 35 miles across (Hubbs and Miller 1948; Norris et al. 1979). Widespread deposits of this lake, known as Lake Cahuilla, have produced locally diverse fossil assemblages of freshwater mollusks (e.g., mussels and snails) and bony fish (e.g., desert pupfish, bonytail chubs, and razorback suckers), as well as rare remains of terrestrial vertebrates including reptiles (horned lizards, spiny lizards, brush lizards, shovel-nosed snakes, night snakes, gopher snakes, ground snakes, sidewinders, and rattlesnakes) and mammals (e.g., cottontail rabbits, pocket mice, kangaroo rats, ground squirrels, and wood rats).

III.10.4.3 Kingston and Funeral Mountains Ecoregion Subarea

The BLM has designated ACECs on BLM-administered lands that contain exceptional paleontological resources. ACECs with paleontological value in this ecoregion subarea include the Mountain Pass/Dinosaur Trackway ACEC.

Fossils from this ecoregion subarea span an incredible range of geologic time and include some of the oldest fossils from the western United States. Proterozoic (~1200 to 800 Ma) fossils preserved in strata of the Pahrump Group occur in several mountain ranges in the ecoregion subarea (e.g., Nopah Range and Kingston Range) and include silicified remains of single-celled prokaryotes (bacteria-like organisms lacking nucleated cells) and some of the earliest known single-celled eukaryotes (organisms with nucleated cells) (Cloud et al. 1969). Fossils of Cambrian age (~540 to 485 Ma) have been collected in the Kelso Mountains (Hagadorn et al. 2000) and Nopah Range (Cooper et al. 1982) and provide important evidence of the transition from soft-bodied (e.g., Ediacaran biotas) to skeletonized multicellular animals (e.g., trilobites, brachiopods, sponges, and eocrinoids) that existed at this time. Younger Paleozoic (Ordovician through Permian; ~470 to 260 Ma) fossils have been collected from a thick sequence of marine strata exposed in the Nopah Range and Clark Mountains and include remains of corals, gastropods, stromatoporoids, and crinoids, as well as conodonts (Miller 1982). Except for the dinosaur footprints from the Jurassic-age (~165 to 145 Ma) Aztec Sandstone exposed in the Mescal Range, fossils of Mesozoic age have not been reported from rocks in this ecoregion subarea.

Cenozoic fossils are also largely unknown in this ecoregion subarea, although the local occurrence of thick sequences of Neogene and Quaternary (~23 to 1 Ma) sedimentary rocks in several areas (e.g., Clark Mountains, Shadow Mountains, Greenwater Valley, and Amargosa Desert) suggests that important paleontological resources may be recovered from these deposits. As an example, Pleistocene vertebrate fossils have been recovered

from a series of valley fill deposits at the Valley Wells site in Shadow Valley that include remains of rabbits, coyotes, horses, camels, llamas, and mammoths (Reynolds et al. 1991a). A thick sequence of older Pleistocene lacustrine deposits at the southern confluence of Greenwater Valley and Chicago Valley is the result of filling pluvial Lake Tecopa, which at maximum size inundated an area of approximately 100 square miles. Vertebrate fossils recovered from these deposits include remains of rabbits, rodents, mammoths, horses, camels, llamas, and deer. These deposits also preserve footprints and trackways of Pleistocene mammals. In other parts of this ecoregion subarea, localized occurrences of Pleistocene cave deposits provide additional paleontological resources. Notable examples occur in the Ivanpah Mountains (Antelope Cave and Kokoweef Cave) and Mescal Range (Mescal Cave), where cave deposits have produced vertebrate fossil remains of reptiles (e.g., tortoises, turtles, lizards, and snakes), birds (e.g., hawks, owls, grebes, and ducks), and land mammals (e.g., shrews, bats, pikas, rabbits, rodents, coyotes, foxes, black bears, ringtails, weasels, badgers, skunks, bobcats, horses, camels, deer, pronghorns, and bighorn sheep).

III.10.4.4 Mojave and Silurian Valley Ecoregion Subarea

The BLM has designated ACECs on BLM-administered lands that contain exceptional paleontological resources. ACECs with paleontological value in this ecoregion subarea include (1) Afton Canyon, (2) the Manix Paleontological Area, and (3) Rainbow Basin/Owl Canyon.

Fossils have been reported from a number of areas within this ecoregion subarea and are primarily mid- to late-Cenozoic in age (Miocene to Pleistocene; ~23 Ma to 10 kilo-annum). The most significant fossils include those recovered from fluvial and lacustrine strata of the Barstow Formation as exposed in the Gravel Hills and Mud Hills north of Barstow and in the Calico Mountains, Daggett Ridge, and Alvord Mountains east of Barstow. These strata span much of the middle Miocene, from ~19 to 13 Ma, and have produced important fossils (bones, teeth, and footprints) of terrestrial mammals (e.g., rodents, bears, weasels, badgers, dogs, cat-like nimravids, horses, rhinos, camels, antelopes, and gomphotheres). These fossils serve as the basis for the Barstovian North American Land Mammal Age.

Vertebrate fossils continue to be discovered and studied by paleontologists from these strata, and the scientific significance of these fossils has been recognized by the Department of the Interior in the ACEC designation of the Barstow Formation exposures in the Mud Hills. The Barstow Formation has also produced exceptional fossils of freshwater invertebrates preserved three dimensionally with their soft anatomy replicated in microcrystalline silica. These fossils have been recovered from lacustrine sediments and represent species of ostracods, fairy shrimps, copepods, diatoms, larvae of diving beetles, flies and mosquitoes, and branchiopods. Younger Miocene-age (~12 Ma) strata of the Avawatz Formation exposed

in the Avawatz Mountains have produced vertebrate fossils that extend the paleontological record for land mammals beyond that documented in the Barstow Formation and allow ecological and taxonomic comparisons to be made with age-equivalent mammal fossils from other areas in the region. Recovered fossils include remains of bats, foxes, bear-dogs, martens, large cats, pikas, rabbits, rodents, gomphotheres, horses, camels, and pronghorns (Whistler and Reynolds 1991).

A surprisingly diverse assemblage of Quaternary fossil invertebrates and vertebrates has been recovered from fluvial and lacustrine strata of the Manix Formation (Jefferson 2003). This rock unit was deposited during the middle to late Pleistocene (~1.0 to 0.02 Ma) in a succession of perennial lakes that at maximum high stand created a large three-lobed lake (Lake Manix) that inundated more than 250 square miles along the ancestral Manix River east of Barstow. Invertebrate fossils from the Manix Formation include freshwater mussels, clams, snails, and ostracods that lived during cooler and wetter glacial periods of the Pleistocene. These fossils occur in association with a diverse freshwater vertebrate assemblage dominated by bony fish, pond turtles, and aquatic migratory birds (e.g., loons, grebes, pelicans, cormorants, storks, flamingoes, swans, ducks, coots, and sandpipers). Alluvial strata in the Manix Formation have also produced important fossils of Ice Age land mammals including ground sloths, rabbits, mice, dire wolves, coyotes, short-faced bears, mountain lions, scimitar-toothed cats, horses, camels, llamas, antelopes, mountain sheep, ancient bison, and mammoths.

These fossils and the sedimentary rocks that contain them serve as an archive documenting the transition from the cooler and wetter glacial conditions of the Pleistocene and the warmer and drier conditions of today. Farther northeast, the ancestral Mojave River flowed out of Lake Manix and continued downstream into pluvial Lake Mojave, deposits of which have the potential to contain additional significant paleontological resources similar to those documented from Lake Manix. During the height of glacial conditions, the Mojave River flowed north out of pluvial Lake Mojave to join with surface flows of the ancestral Amargosa River to eventually flood the Death Valley region, thus forming pluvial Lake Manly. The Bitter Springs Playa deposits in the Tiefort Basin at the Fort Irwin National Training Center have produced a diverse assemblage of Pleistocene vertebrates that includes fossil remains of reptiles (e.g., tortoises, snakes) and land mammals (e.g. rabbits, rodents, coyotes, dire wolves, short-faced bears, American lions, saber-toothed cats, mammoths, horses, camels, llamas, and deer). Pleistocene fossils of ground sloths, wild dogs, jaguars, and horses have also been collected from this site.

Extensive sequences of Pleistocene lacustrine and alluvial fan deposits occurring in the valleys adjacent to the Granite Mountains might contain additional remains of terrestrial vertebrate fossils.

III.10.4.5 Owens River Valley Ecoregion Subarea

Fossil occurrences in this ecoregion subarea are primarily limited to those preserved in the Pleistocene lake beds associated with ancient Owens Lake. At several sites in Owens Valley, Pleistocene pluvial lake deposits have produced vertebrate fossils, including remains of birds, rodents, extinct cats, proboscideans, horses, camels, and bison (Jefferson 2010).

III.10.4.6 Panamint Death Valley Ecoregion Subarea

Fossils from this ecoregion subarea are limited but preserve significant records of life in this part of the Great Basin. The fossil mammalian fauna recovered from the Goler Formation in the El Paso Mountains represents the only diverse assemblage of Paleocene vertebrate fossils from California and provides a unique opportunity to understand regional conditions of faunal exchange and evolution during the early part of the Age of Mammals. Pleistocene pluvial lake deposits associated with Lake Rogers and Lake Dumont in the Death Valley region have produced fossil remains of pond turtles, cormorants, ducks, coots, camels, and mammoths (Jefferson 2010), and document the dramatic ecological changes in this region just since the end of the most recent Ice Age.

A literature and records search was completed for the Death Valley National Park region by Robert E. Reynolds, curator, Earth Sciences, in the San Bernardino County Museum in Redlands, California. The records and literature search identified a number of potentially sensitive fossiliferous areas within the park area. Significant paleontological resources and records relating to paleobiostratigraphic events that occur within or near the park include (Nyborg and Santucci 1999):

- The world's oldest mitosing cells, 990 million years old, preserved in silica in the Beck Spring Formation.
- Significant Cambrian trilobite and invertebrate fossil localities that mark the boundary of the Paleozoic Era, 555 million years old.
- Significant occurrences of Paleozoic invertebrate fossils and the possibility of very old fossil fish in Death Valley National Park.
- Panamint Range localities that contain significant marine cephalopods and invertebrate fossils.
- The early record of the Oligocene Tertiary Era from north of the Mojave Desert, found in the Grapevine Mountains in Death Valley National Park; important fossils including rodents, canids, horses, helaletids, brontotheres, rhinoceros, oredonts, and leptomerycids.

Extremely important Late Miocene trackways, associated with important vertebrate fossils, occur in the Black Mountains in Death Valley National Park and in the Avawatz Mountains south of the park (see Section III.10.4.4, Mojave and Silurian Valley Ecoregion Subarea). The Black Mountains area includes a wide range of camels, horses, gomphotheres, and aquatic bird trackways associated with a shallow freshwater lakeshore.

III.10.4.7 Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

At the Rabbit Springs site in the Lucerne dry lake beds, remains of horses and possibly camels have been reported. Other Pleistocene playa lake beds in this region might produce similar and possibly more diverse vertebrate fossil remains. On Marine Corps Air Ground Combat Center Twentynine Palms, paleontological reconnaissance efforts have discovered Pleistocene vertebrate fossils associated with early Pleistocene-age (~2 Ma) alluvial fan deposits. Collected fossils include well-preserved remains of freshwater fish, salamanders, frogs, toads, giant tortoises, snakes, shore birds, ground sloths, shrews, pikas, rabbits, rodents, ringtails, horses, peccaries, camels, llamas, and deer. The Pinto Basin between the Pinto Mountains and the Eagle Mountains has recently begun to yield an increasingly diverse assemblage of Pleistocene marine vertebrates that includes birds (e.g., ducks and hawks) and mammals (e.g., rabbits, badgers, dogs, mammoths, horses, camels, llamas, antelopes, deer, sheep, and bison).

Dry caves in the region have produced localized occurrences of late Pleistocene to early Holocene vertebrate fossils including those at Newberry Cave and Schuiling Cave in the Newberry Mountains, where remains of reptiles (e.g., tortoises, chuckwallas, and rattlesnakes), birds (e.g., ducks, condors, hawks, coots, and owls), and land mammals (e.g., ground sloths, rabbits, rodents, coyotes, foxes, raccoons, badgers, pumas, bobcats, horses, camels, llamas, pronghorns, and bighorn sheep) have been collected.

III.10.4.8 Piute Valley and Sacramento Mountains Ecoregion Subarea

Fossils known from this ecoregion subarea are very limited and primarily associated with the older Pleistocene alluvial fan deposits and correlative fluvial sediments broadly referred to as the Chemehuevi Formation. These fossils consist of sparse remains of freshwater fish. However, elsewhere along the Colorado River drainage, strata assigned to the Chemehuevi Formation have produced more diverse fossil assemblages that include freshwater mollusks and ostracods, birds, and land mammals (horses, antelopes, and mammoths). This record suggests the potential for additional discoveries of Pleistocene vertebrate fossils in the region. In addition, the potential exists for the discovery of Pliocene fossils in isolated, erosional remnants of the Bouse Formation in the area.

III.10.4.9 Providence and Bullion Mountains Ecoregion Subarea

The BLM has designated ACECs on BLM-administered lands that contain exceptional paleontological resources. ACECs with paleontological value in this ecoregion subarea include the Marble Mountain Fossil Bed ACEC.

Fossils from this ecoregion subarea span a range of geologic periods from the early Paleozoic (~520 Ma) to the late Pleistocene (~10 kilo-annum). Carbonate strata exposed in the New York Mountains, Providence Mountains, and Marble Mountains have produced some of the best-preserved evidence of Cambrian (~515 Ma) life from California. This is especially the case for outcrops of the Latham Shale in the southern Marble Mountains, where a diverse assemblage of shallow marine invertebrates has been recovered that includes remains of trilobites, the bizarre *Anomalocaris*, early articulate brachiopods, strange hyoliths, and eocrinoids. Younger Paleozoic (Devonian through Permian) marine sedimentary rocks crop out in the Providence Mountains and have produced fossil remains of a variety of marine invertebrate animals including fusulinids, corals, brachiopods, gastropods, bivalves, trilobites, and crinoids.

Cenozoic fossils known from this ecoregion subarea include a temporal succession of terrestrial vertebrates collected from the Miocene-age (~21 to 15 Ma) Hector Formation as exposed in the Cady Mountains. The oldest fossils in this rock unit predate the more diverse assemblages of the Barstow Formation and include age-significant species of oreodonts, camels, and carnivorans. Slightly younger strata of the Hector Formation cropping out in the northern Cady Mountains have produced additional mammalian fossil remains including those of mice, beavers, dogs, horses, rhinoceros, camels, and antelopes.

Dry caves in the region have yielded localized occurrences of late Pleistocene to early Holocene vertebrate fossils including those at Mitchell's Caverns in the Providence Mountains where remains of reptiles (e.g., tortoises), birds (e.g., coots, roadrunners, and crows), and land mammals (e.g., ground sloths, rabbits, rodents, foxes, ringtails, bobcats, horses, camels, and sheep) have been collected. As with other playa lakes in the sediment-filled basins of the Mojave Desert, those in this ecoregion subarea contain fossil remains of animals that lived in and around Pleistocene pluvial lakes. A good example is represented by paleontological work in Fenner Valley, which recovered a diverse assemblage of middle to late Pleistocene vertebrates including amphibians (e.g., toads), reptiles (e.g., tortoises, lizards, and snakes), birds, and land mammals (e.g., rabbits, rodents, cats, camels, and antelopes).

III.10.4.10 West Mojave and Eastern Slopes Ecoregion Subarea

The BLM has designated ACECs on BLM-administered lands that contain exceptional paleontological resources. ACECs with paleontological value in this ecoregion subarea include the Horse Canyon ACEC.

Fossils have been reported from a number of areas within this ecoregion subarea and are primarily mid- to late-Cenozoic in age (Miocene to Pleistocene; ~23 Ma to 10 kilo-annum). Miocene fossils from north of the Garlock Fault include significant assemblages of land plants and mammals from the Bopesta Formation (~16 to 12 Ma; Quinn 1987) in the eastern Tehachapi Mountains. An even more diverse assemblage of reptiles (e.g., turtles, lizards, and snakes), birds (e.g., ducks and hawks), and mammals (e.g., bats, hedgehogs, foxes, bear-dogs, bears, cats, ringtails, badgers, skunks, squirrels, beavers, mice, gophers, rabbits, gomphotheres, rhinoceros, horses, oreodonts, peccaries, camels, and antelopes) has been recovered from the Dove Spring Formation (~13 to 7 Ma; Whistler and Burbank 1992). These are exposed in Red Rock Canyon State Park at the east end of the El Paso Mountains. South of the Garlock Fault near the town of Mojave, younger Miocene mammal fossils (e.g., bats, moles, rabbits, mice, dogs, bears, saber-toothed cats, gomphotheres, horses, rhinoceros, peccaries, llamas, camels, and pronghorns) have been reported from the Horned Toad Formation (~6 to 5 Ma; May et al. 2011). Away from the mountains, early and middle Miocene fossils have been reported from a few isolated locations including the open pit borate mine near Boron (Whistler 1984), where alluvial and lacustrine strata of the Tropico Group (~21 to 18 Ma) produced a small vertebrate assemblage (e.g., lizards, snakes, rabbits, squirrels, mice, oreodonts, camels, and antelopes). Additional Miocene vertebrate fossil discoveries have been made in the Kramer Hills, in the Bissell Hills, and at Edwards Air Force Base, where paleontological surveys resulted in the collection of land mammal fossils (Reynolds 1988).

Pleistocene vertebrate fossils have been reported from a number of sites in this ecoregion subarea and include the discovery of bones and teeth of freshwater fish (e.g., sticklebacks), amphibians (e.g., toads), reptiles (e.g., lizards and snakes), and land mammals (e.g., rabbits, rodents, badgers, coyotes, ground sloths, horses, camels, bison, and mammoths) from sediments of pluvial Lake Thompson near Rosamond (Reynolds and Reynolds 1991; Wilkerson et al. 2011). This lake may have inundated an area up to 200 square miles during the late Pleistocene, including the present-day Rosamond and Rogers playa lake beds. Additional reports of fossils from pluvial lake deposits in this ecoregion subarea come from Harper Dry Lake in Harper Valley and Searles Dry Lake in Indian Wells Valley.

III.10.5 Paleontological Resources—Affected Environment Outside the DRECP Area

Similar to the DRECP area, in the larger context of the Southern California region, specific locations and geologic units are known to yield fossils. There are also areas that have not been studied and for which little information exists on the potential for paleontological discoveries. These sensitive areas vary locally and regionally and depend on factors of the geologic environment that are site-specific. Certain generalizations can be made about the potential for various rock units to yield paleontological resources (e.g., sedimentary rocks of Pleistocene-age or older that can be fossil-rich versus granitic rocks that are devoid of life).

Section III.10.1 provides the regulatory setting for paleontological resources. Regulations and guidelines also include the PRPA, California Desert Conservation Act Plan, BLM Bakersfield Field Office Proposed Resource Management Plan, BLM Eastern San Diego County Field Office Resource Management Plan, and National Park Service Reference Manual #77—Paleontological Resources Management. State regulations include the California Public Resources Code Section 5097.5 and Code of Regulations, Sections 4307 and 4309.

The corridors anticipated to be used in future transmission outside the DRECP area are existing transmission corridors in four geographic areas: San Diego, Los Angeles, North Palm Springs–Riverside, and Central Valley. Each has varying degrees of disturbance from previous transmission line construction, which involves ground disturbance to develop or upgrade access roads and augur holes to pour concrete foundations at tower locations. Nevertheless, new transmission lines would require new foundations and, in some cases, new or upgraded access roads. The ground disturbance could impact unknown paleontological resources.

III.10.5.1 San Diego Area

This transmission corridor extends from Ocotillo, in southwestern Imperial County, to San Diego, roughly following the existing Sunrise Powerlink corridor westward. There are geologic units in the San Diego area with moderate and high sensitivity for the presence of fossils. Examples of previous finds include marine invertebrates and vertebrates, mollusks, terrestrial mammals (deer, horses, camels, bison, mammoths, saber-toothed cats, sloths, short-faced bears), reptiles, birds, and fossilized plants.

III.10.5.2 Los Angeles Area

This transmission corridor extends from the Palmdale area to the Los Angeles Basin roughly following Segments 6, 7, and 11 of the Tehachapi Renewable Transmission Project. There are geologic units in this area with a moderate to high sensitivity for the presence of fossils.

Examples of previous finds include marine snails, clams, brachiopods, marine fish, baleen whales, mammoths, and ground sloths.

III.10.5.3 North Palm Springs–Riverside Area

The North Palm Springs–Riverside transmission corridors extend from the Devers Substation near Palm Springs to the Rialto, Lugo, and Valley substations in San Bernardino County, following part of the existing Devers–Palo Verde No. 2 corridor. There are geologic units in this area with moderate to high sensitivity for fossil finds. Examples of previous finds include gastropods, bivalves, shallow marine invertebrates, birds, reptiles, fish, and terrestrial mammals (mammoths, saber-toothed cats, ground sloths, short-faced bears, horses, and camels).

III.10.5.4 Central Valley Area

This transmission corridor is the longest of the four, extending from Rosamond in the Northern Mojave Desert to Tracy, roughly following the existing Path 15 and 26 transmission corridors and Interstate 5. There are geologic units in the Central Valley with moderate to high sensitivity for the presence of fossils. Examples of previous finds include dinosaurs, plesiosaurs, mosasaurs, turtles, sharks, bony fish, mollusks, and other marine and freshwater fossils.

III.11 LAND USE AND POLICIES

The Desert Renewable Energy Conservation Plan (DRECP) area encompasses the Mojave, Sonoran, and Colorado deserts in Southern California and covers approximately 22.6 million acres of desert regions and adjacent lands in seven counties within Southern California. These lands include:

- Areas of Eastern San Diego County and Imperial County in the southern portion of the DRECP area.
- Eastern Riverside County.
- Northeastern Los Angeles County.
- San Bernardino County, in the central portion of the DRECP area.
- Eastern Kern and Inyo counties in the northern portion of the DRECP area.

This analysis of land use and policies does not apply to lands managed by the Bureau of Land Management (BLM). This analysis applies to lands within or outside of the Land Use Plan Amendment (LUPA) Decision Area, where future transmission may be developed or where indirect effects from activities on BLM land may occur. With regard to BLM lands, several chapters of this environmental impact statement (EIS) include detailed information related to the physical and regulatory environments specific to land uses on LUPA Decision Area lands. These include Chapters III.9, Native American Interests; III.13, BLM Lands and Realty; III.14, BLM Land Designations, Classifications, Allocations, and Lands with Wilderness Characteristics; III.16, Livestock Grazing; III.18, Outdoor Recreation; and III.24, Department of Defense Lands and Operations.

This chapter provides an overall description of and summarizes the land uses, land ownership, and policies pertaining to the DRECP area. Appendix R1-11, Land Use and Policies, includes maps and tables supporting this chapter. The maps illustrate the land ownership within the DRECP area and by ecoregion subarea. The tables provide acreages of land use by federal, state, and local agency jurisdiction and by ecoregion subarea. This chapter summarizes the detailed land ownership and land acreages presented in Appendix R1-11.

III.11.1 Regulatory Setting

Federal, state, and local regulations pertaining to land use depend upon jurisdictional controls in affected lands. Federal and state regulations that apply to land use are summarized in the next few sections.

III.11.1.1 Federal

As discussed in Volume I, Section I.2, Legal Framework, several federal laws govern land use within the DRECP area and provide guidance for making land use decisions regarding federal lands, including:

- The National Environmental Policy Act of 1969.
- The Federal Endangered Species Act.
- The Migratory Bird Treaty Act.
- The Bald and Golden Eagle Protection Act of 1940, as amended.
- The National Historic Preservation Act.
- The Federal Land Policy and Management Act.

Volume I of this document summarizes these laws. Additional applicable federal laws and policies are contained in the California Desert Protection Act, Omnibus Public Land Management Act, Wild and Scenic Rivers Act, National Trails System Act, and the Bureau of Land Management Manual 6320. Chapter III.14 discusses additional federal laws and policies as applicable to BLM-administered lands. Laws, regulations, and orders specific to renewable energy development include the Energy Policy Act of 2005; Executive Orders 13212, 13514, 3285, and 3285A1; and the BLM Solar Energy Development Policy, all of which are summarized in Volume I of this document.

III.11.1.2 State

In addition to federal laws and regulations, a number of state laws govern land use in the DRECP area and provide guidance for making land use decisions that affect lands under the jurisdiction of California state agencies. These regulations include the California Environmental Quality Act, the California Endangered Species Act, and the Natural Community Conservation Planning Act. Volume I of this document summarizes these laws. Laws, regulations, and orders specific to renewable energy development include California's Renewables Portfolio Standard, the Renewable Energy Transmission Initiative, Executive Order S-14-08, Senate Bill 34, and Senate Bill X1-2.

State planning law requires each city and county to prepare and adopt a comprehensive, long-term general plan for its physical development (Government Code Section 65300 et seq.). A General Plan is the city and county's basic planning document. It provides the blueprint for development through the community and is the vehicle through which competing interests and the needs of the citizenry are balanced and meshed. State planning law has been codified in the California Government Code: Section 65300 et seq. (General Plan and specific plan),

Section 65800 et seq. (State Zoning Law), Section 66410 et seq. (Subdivision Map Act), and Section 65864 et seq. (development agreements); and, the California Land Conservation Act (the Williamson Act, California's premier agricultural land protection law).

III.11.1.3 Local

Local plans and regulations guide land use decisions within the DRECP area that are under the jurisdiction of cities, counties, and special districts (e.g., schools, utility providers). These lands generally include privately owned, locally controlled, or publicly owned lands such as parks, fire stations, libraries, schools, and hospitals. They also include utilities, such as water and sewer treatment facilities, pipelines, electric facilities, substations, and transmission and distribution lines. Local plans and regulations would not apply to lands owned by federal or state entities (e.g., BLM lands and California State Lands Commission [CSLC] lands). However, on publicly owned lands, federal and state agencies often consider local regulations in their decisions. For instance, the CSLC's practice is to consider and comply with local regulations when approving projects on state lands.

City and county governments exercise their land use and planning authority (regulation and control) through the adoption of land use plans such as a General Plan, a Local Coastal Plan, or an airport land use plan, and adoption of ordinances such as a land development code and zoning code.

III.11.2 Existing Land Management and Uses in the DRECP Area

Existing land management and use within the DRECP area boundaries are diverse, with a range of uses that are subject to jurisdictions or agencies with different statutory and regulatory responsibilities. As described in Section III.11.3, many land use and resource management plans are applicable to lands in the DRECP area. Major landholdings include:

- Two national parks, one national preserve, and one national historic site.
- Two national wildlife refuges and several state wildlife preserves.
- Portions of three national forests.
- Lands under the jurisdiction of seven BLM field offices in two districts.
- Eight tribal reservations and many smaller holdings of tribal lands.
- Six military reservations, weapons centers, air bases, and bombing and gunnery ranges.
- State school lands and reserved mineral interests where surface rights have been sold.
- State sovereign lands associated with Owens Lake and the Colorado River.

- Twelve state parks, many smaller state land units, and areas of special designation.
- Seven counties and many incorporated cities and towns.

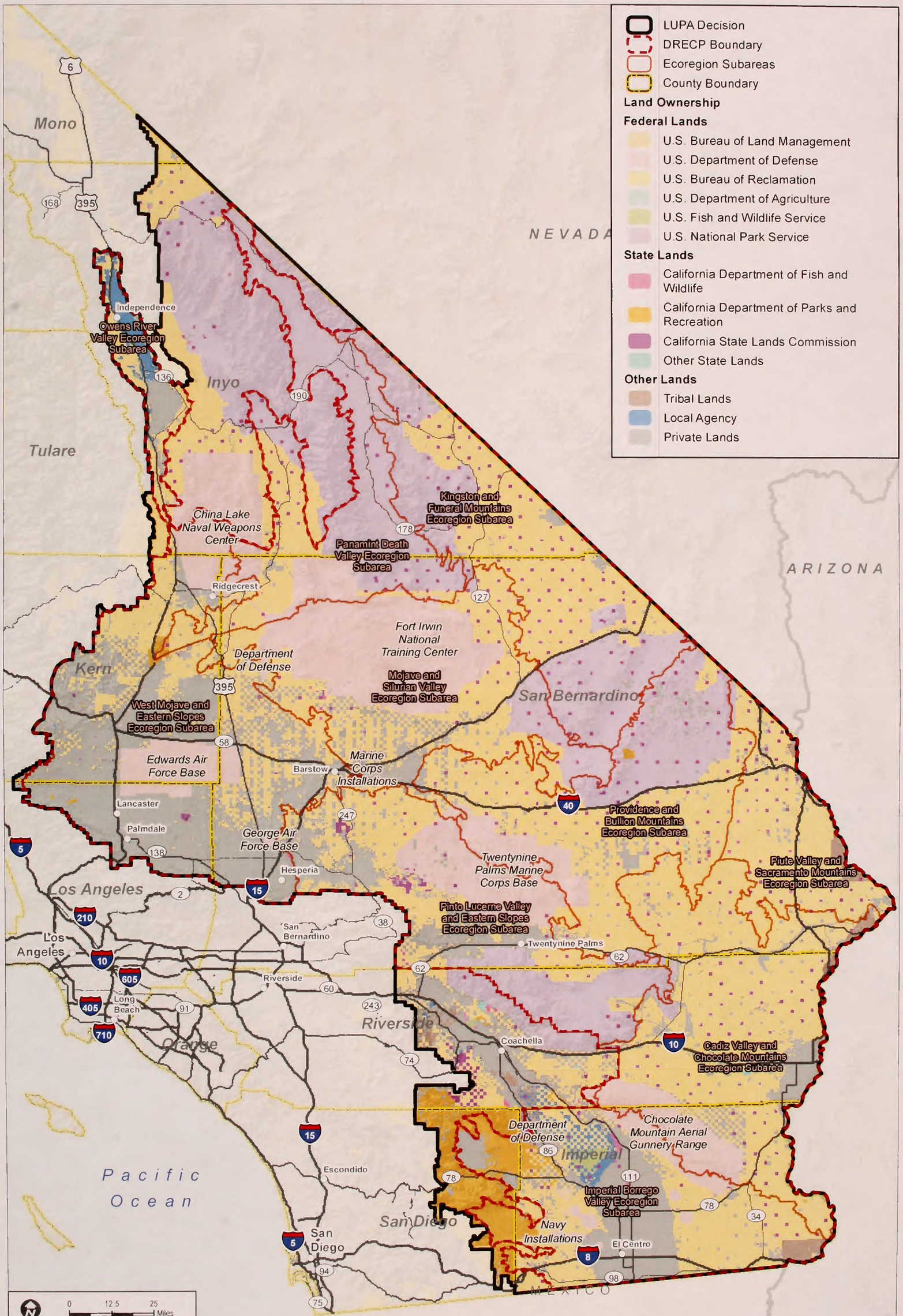
Existing renewable energy projects (solar, wind, and geothermal) encompass approximately 89,000 acres within the DRECP area. These projects are shown in Chapter III.1, Figures III.1-2(a) and III.1-2(b). The main concentrations of renewable energy projects are in Kern, Los Angeles, San Bernardino, and Imperial counties. The affected environment includes 53 renewable energy projects totaling 6,250 megawatts (MW) that are either operational or under construction. As of October 2013, approximately 28% of these renewable energy projects were on BLM lands, and 72% were on either private or other public lands. Most of the large-scale renewable energy projects are on BLM lands in Riverside and San Bernardino counties (e.g., Desert Sunlight Solar Farm, 550 MW).

Table III.11-1 presents land acreage by ownership in the DRECP area, and Figure III.11-1 illustrates land ownership within the somewhat larger LUPA Decision Area. Section III.11.4 summarizes land uses in the DRECP area by ecoregion subarea.

Table III.11-1
DRECP Area Land Status

Land Management Agency	Acres	Percent of DRECP Area
BLM	10,008,266	44.3
Local Jurisdictions (counties, cities, districts – includes privately owned lands)	4,767,955	21.1
National Park Service	3,819,774	16.9
Department of Defense	3,035,622	13.4
CSLC	340,533	1.5
State Parks	292,771	1.3
Tribal Lands	132,296	0.6
Bureau of Reclamation	85,250	0.4
California Department of Fish and Wildlife	51,243	0.2
U.S. Fish and Wildlife Service	49,694	0.2
University of California	1,590	<0.01
U.S. Forest Service	565	<0.01
Total	**22,583,898**	**100**

Note: All acreages derived from best available data. Because acres are based on specific land management boundaries, they have not been rounded in this section.
Includes municipalities, nonprofits, and public utility districts.
Some of the CSLC land is counted as BLM land as well due to mapping inaccuracies. Overlaps account for almost 1,700 acres.
There are no participating tribes in the draft DRECP to date; DRECP decisions would not apply to tribal lands. These data are for informational purposes only.



Sources: ESRI (2014); BLM (2015); RECON (2015)

FIGURE III.11-1

Land Ownership within the LUPA Decision Area

DRECP Proposed LUPA and Final EIS

October 2015

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III.11.2.1 Federal Lands

Six federal agencies manage approximately 17 million acres, or about 75% of the DRECP area.

III.11.2.1.1 Bureau of Land Management

The BLM manages approximately 10 million of the 17 million acres of federal land within the DRECP area, or 44% of the total DRECP area. Topographically, BLM land ranges from low deserts to high mountains. The land uses are as varied as the terrain and include livestock grazing, fish and wildlife habitat, energy development, land use authorizations, and a wide range of outdoor recreation activities. These uses are managed within a framework of numerous public land laws, the most comprehensive of which is the Federal Land Policy and Management Act. It requires that public lands be managed in accordance with land use plans, which must be developed based on the principles of multiple use and sustained yield. The term "multiple use" means the management of public lands must be performed in combinations that will best meet the present and future needs of the public. The term "sustained yield" means the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the public lands consistent with multiple use. The Federal Land Policy Management Act requires BLM to manage public lands on the basis of multiple use and sustained yield unless otherwise specified by law. BLM-managed lands are described in Chapter III.14.

III.11.2.1.2 Bureau of Reclamation

The Bureau of Reclamation manages facilities on approximately 85,000 acres, or 0.4% of the DRECP area. These lands consist of small parcels clustered primarily in two areas: immediately west of the Salton Sea and in the southeast corner of the DRECP area along the Colorado River. The Bureau of Reclamation manages its lands primarily for water development.

III.11.2.1.2 Department of Defense

The Department of Defense (DOD) administers 11 areas covering approximately 3 million acres, or approximately 13% of the DRECP area. The DOD manages its land to provide realistic test and training environments for military operations, as required by Title 10 (Armed Forces) of the United States Code. The majority of DOD lands are within the following five facilities: Edwards Air Force Base (306,675 acres), Marine Corps Air Ground Combat Center Twentynine Palms (597,064 acres), Chocolate Mountain Aerial Gunnery Range (447,165 acres), and Naval Air Weapons–China Lake and Fort Irwin Army National Training Center (1,242,467 acres). Chapter III.24 provides additional information regarding DOD lands and operations.

III.11.2.1.3 National Park Service

The National Park Service (NPS) administers approximately 3.8 million acres, or approximately 17% of the DRECP area. NPS lands within the DRECP area include Joshua Tree National Park (600,948 acres), Mojave National Preserve (1,418,911 acres), portions of Death Valley National Park (1,785,852 acres), and Manzanar National Historic Site (814 acres). Joshua Tree National Park is north of Interstate 10 (I-10) on the San Bernardino–Riverside county line. Mojave National Preserve is in the east-central part of the DRECP area, roughly bounded by I-15, I-40, and the Nevada state line. Death Valley runs along the northeastern boundary of the DRECP area in San Bernardino and Inyo counties.

The NPS manages its lands for the conservation, preservation, protection, and interpretation of the nation's natural, cultural, and historic resources. Public use of NPS lands includes wilderness, recreation, scenic preservation, scientific study, education, conservation, historical use, and solitude. The NPS manages its wilderness lands under provisions of the Wilderness Act of 1964.

III.11.2.1.4 U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) manages approximately 50,000 acres, or 0.2% of the DRECP area. The USFWS manages its lands for the conservation and protection of fish and wildlife and their habitats. Nearly all of the USFWS-administered land in the DRECP area is within the Sonny Bono Salton Sea National Wildlife Refuge in Imperial County.

III.11.2.1.5 U.S. Department of Agriculture, Forest Service

The U.S. Forest Service (USFS) manages nearly 600 acres of land, or less than 0.01% of the DRECP area. The USFS mission is to "achieve quality land management under the sustainable multiple-use management concept to meet the diverse needs of people (USFS 2013)." The majority of USFS land in the DRECP area is within Los Angeles County (411 acres). Remaining acres are located in San Bernardino (148 acres) and Kern (5 acres) counties.

III.11.2.2 State Lands

Four state agencies—California Department of Fish and Wildlife (CDFW), CSLC, California State Parks, and the University of California—together manage almost 690,000 acres, or roughly 3% of the DRECP area.

III.11.2.2.1 California Department of Fish and Wildlife

The CDFW manages approximately 51,200 acres of land, or approximately 0.2% of the DRECP area. As shown in Table R1.11-1 (presented in Appendix R1), CDFW-managed lands

include approximately 10,000 acres of wildlife areas, approximately 25,000 acres of ecological reserves, and approximately 15,000 acres of other areas.

III.11.2.2.2 California State Lands Commission

The CSLC manages approximately 340,533 acres of school lands, or 1.5% of the DRECP area. The CSLC also has jurisdiction over additional interests where the state has retained mineral rights after selling the surface rights. Together, these lands form a patchwork of small parcels found throughout the DRECP area, mostly in San Bernardino County and Eastern Riverside County. The CSLC is the largest state agency landowner in the DRECP area.

The CSLC manages its sovereign lands for the benefit of all the people of California, subject to the public trust, for water-related commerce, navigation, fisheries, recreation, open space, and other recognized uses.

On October 16, 2008, CSLC adopted a resolution supporting the environmentally responsible development of school lands under its jurisdiction for renewable energy-related projects. In this resolution, CSLC resolved that lands within its jurisdiction may be developed only with assurances that the state's unique and sensitive environments will be protected. The resolution also defines the CSLC's support for the environmentally responsible development of school lands under the CSLC's jurisdiction. The resolution further states that CSLC should encourage project proponents to submit applications for the use of school lands for the environmentally responsible development of renewable energy.

A memorandum of agreement, executed in May 2012 between the CSLC and the Department of the Interior, acting through BLM, describes the terms and procedures for land exchanges between these agencies to consolidate school lands into larger parcels suitable for commercial-scale renewable energy projects.

The CSLC also has jurisdiction over the beds of navigable lakes and waterways. These lands are known as sovereign lands, which CSLC manages on behalf of all people of the state pursuant to the Public Trust Doctrine. The CSLC negotiates leases of sovereign lands only when the proposed uses are determined by CSLC not to be inconsistent with the public trust.

III.11.2.2.3 California Department of Parks and Recreation

California State Parks administers approximately 1.3% of the DRECP area (292,800 acres) as state parks, recreation areas, a natural reserve, and other facilities within its system. California State Parks manages its lands to preserve the state's biological diversity, protect its natural and cultural resources, and create opportunities for high-quality outdoor

recreation. Chapter III.18 presents detailed information on recreational facilities in the DRECP area. Refer to this section for information on the acreage associated with California State Park facilities.

III.11.2.3 County Lands

The DRECP area includes all or portions of seven counties (Imperial, Inyo, Kern, Los Angeles, Riverside, San Bernardino, and San Diego) and 21 cities. Unincorporated lands within county jurisdictions, incorporated cities, and local districts account for nearly 4.8 million acres, or approximately 21% of the roughly 22.6 million acres within the DRECP area. Table R1.11-2 (presented in Appendix R1) provides the approximate distribution of planned land use types within the local agencies and jurisdictions of the seven counties. Land use authority for privately owned lands rests with the specific city or county in which the property is located.

III.11.2.3.1 Imperial County

Imperial County covers 2,942,080 acres and includes the seven incorporated cities of Brawley, Calexico, Calipatria, El Centro, Holtville, Imperial, and Westmorland, as well as federal, state, and tribal lands. Of this total, an estimated 2,774,033 acres are within the DRECP area. Approximately one-third of Imperial County's lands within the DRECP area (approximately 914,000 acres) are subject to local land use authority, which includes Imperial County; the unincorporated communities of Heber, Seeley, Ocotillo, Niland, Bombay Beach, Palo Verde, Desert Shores, Salton City, Salton Sea Beach, Winterhaven, and Bard; and incorporated cities and local districts (e.g., utility, hospital, or school districts). More than 60% of this total (approximately 1.7 million acres) is under federal jurisdiction, primarily under BLM and DOD jurisdictions. An additional almost 101,000 acres, or approximately 4% of Imperial County's land within the DRECP area, are under state agencies' jurisdictions. Local tribes control an estimated 56,000 additional acres.

III.11.2.3.2 Inyo County

As the second-largest county in California, Inyo County covers an estimated 6.5 million acres, or 10,140 square miles. Nearly half (2,987,400 acres) is in the DRECP area. The majority of lands in Inyo County are under the management of federal agencies. An estimated 2,668,000 acres of Inyo County in the DRECP area are made up of Inyo National Forest, Death Valley National Park, China Lake Naval Weapons Center, and BLM-administered lands. California state agencies control an additional 57,000 acres. Of the approximately 262,000 acres within the DRECP area but outside of federal, state, or tribal jurisdictions, the Los Angeles Department of Water and Power, as part of the Owens Valley aqueduct and associated lands, owns or controls 213,713 acres. The amount of land held in private

ownership is very small—only 1.9%. As a result of this pattern of public-land ownership, Inyo County is largely rural in character. Private, county, and Los Angeles Department of Water and Power facilities are included in Inyo County's General Plan.

III.11.2.3.3 Kern County

The unincorporated area of Kern County includes an estimated 5 million acres of land. Of the approximately 1,746,000 acres within the DRECP area, approximately 821,000 acres, or 47%, are under federal jurisdiction, with the BLM and DOD controlling a majority (approximately 533,000 and 288,000 acres, respectively). An additional 28,000 acres, or 1.6% of the DRECP area within Kern County, are controlled by state agencies (CDFW, California State Parks, and CSLC), and an additional 231 acres are controlled by tribes. An estimated 897,000 acres (51%) of land in Kern County is designated for a range of uses, including general agriculture (approximately 281,000 acres), open space (approximately 292,000 acres), and residential (approximately 152,000 acres). An estimated 37,000 acres are planned for commercial, industrial, or industrial/commercial uses.

III.11.2.3.4 Los Angeles County

Los Angeles County encompasses 4,084 square miles, or more than 2.6 million acres. Of this, more than half (2,638 square miles or 1.7 million acres) is unincorporated. Approximately 680,000 acres are within the DRECP area, with an estimated 55,000 acres under federal jurisdiction (mostly DOD and BLM) and approximately 5,500 acres under the jurisdiction of California State Parks. Of the 680,000 acres subject to local agency or district control, by far the majority is planned for residential, mixed use, or other specific plan (approximately 524,000 acres) land uses. An estimated 55,000 acres within the DRECP area are designated for commercial, industrial, and combined industrial/commercial development, or public open space (approximately 8,900 acres).

III.11.2.3.5 Riverside County

Riverside County is the fourth largest county in the state, encompassing approximately 7,400 square miles (more than 4.7 million acres) and extending nearly 200 miles westward from the Colorado River to within 14 miles of the Pacific Ocean. It includes the desert regions of the Coachella Valley and Palm Springs, as well as the San Jacinto, Little San Bernardino, and Santa Rosa mountains; portions of Anza-Borrego Desert State Park and the Salton Sea State Recreation Area; and most of Joshua Tree National Park. Riverside County includes 28 incorporated cities and an unincorporated area encompassing an estimated 4.2 million acres. The General Plan Land Use Map describes Riverside County as predominately rural and natural in character.

The proposed DRECP area encompasses approximately 45% of Riverside County, or an estimated 2,147,000 acres, located in the eastern portion of the county. The eastern portion of Riverside County lies between the Colorado River on the east and the Santa Rosa and San Jacinto mountains on the west. This portion of Riverside County is distinguished from the western portion by its desert terrain and relatively lightly populated, relatively uncongested communities. Of the more than 2 million acres in eastern Riverside County, approximately 86% (1,846,000 acres) is under federal jurisdiction. The BLM controls 1.3 million acres, NPS controls 0.48 million acres, and DOD controls 0.11 million acres. The CSLC and CDFW hold jurisdiction over an additional approximately 35,000 acres and approximately 1,900 acres, respectively. Tribal lands account for approximately 12,000 acres. Of the estimated 252,000 acres subject to local control (county, cities, and districts), approximately 131,000 acres are designated as open space and 93,000 acres as general agriculture. Residential, rural residential, and specific plans account for approximately 22,000 acres. Designated commercial, industrial, and combined natural/mineral resources lands total approximately 1,500 acres. Remaining acres include lands within transportation rights-of-way and other categories.

III.11.2.3.6 San Bernardino County

San Bernardino County, with a land area of 20,106 square miles, is the largest county in the continental United States. Of the almost 13 million acres making up San Bernardino County, approximately 10.5 million acres (81% of the total) are outside the governing control of the San Bernardino County Board of Supervisors. This land is referred to as "non-jurisdiction" land or "non-jurisdiction" territory. Of this non-jurisdiction land, approximately 6 million acres are managed by BLM, and 1.9 million acres are managed by DOD. Of the remaining 19% of San Bernardino County's total land area, approximately 4% lies within 24 incorporated cities. While the county influences a certain degree of development activity within these cities (primarily administrative buildings, criminal justice facilities, and certain limited infrastructure, including county-maintained roads), the city councils of the 24 cities directly regulate land use and planning within their respective cities. Fifteen percent (about 1.9 million acres) is entirely under county jurisdiction.

The proposed DRECP area encompasses an estimated 11,982,000 acres (18,721.9 square miles), or a majority of the county's area. Of this total, approximately 83% (9,907,000 acres) is under federal jurisdiction. The BLM controls more than 6 million acres, DOD more than 2 million acres, and NPS more than 1.7 million acres. Remaining federal lands are controlled by the USFWS and USFS. Tribal lands account for approximately 63,000 acres. Lands under state jurisdiction total approximately 258,000 acres, with the CSLC holding jurisdiction over approximately 219,000 acres. Tribal lands account for approximately 63,000 acres of the DRECP area in San Bernardino County.

Of the estimated 1,754,000 acres subject to local control (county, cities, and districts), 830,000 acres are designated open space and 750,000 acres are designated as residential. An additional 47,000 acres are designated as general agriculture. Approximately 77,000 acres are designated Commercial, Industrial, or Specific Plan–Commercial Industrial. Remaining acres include lands within transportation rights-of-way and other categories.

III.11.2.3.7 San Diego County (part)

The unincorporated portion of San Diego County encompasses approximately 2.3 million acres, or 3,570 square miles. More than 90% of unincorporated county lands are either open space or undeveloped. This includes several large federal, state, and regional parklands that encompass much of the eastern portion of San Diego County.

The proposed DRECP area encompasses only a small portion (268,000 acres or just more than 417 square miles) of the easternmost portion of San Diego County. Of this total, approximately 74% (approximately 198,000 acres) is Anza-Borrego Desert State Park. The BLM controls only 179 acres. Of the remaining lands subject to county jurisdiction, the majority are designated Residential (approximately 58,000 acres) and Open Space (approximately 11,000 acres). Remaining acres are designated Commercial (633 acres) and Industrial (163 acres). No tribal lands are within the San Diego County portion of the DRECP area.

III.11.3 Existing Planning Documents

The discussion in the following sections summarizes federal, state, and county planning documents applicable to the DRECP area.

III.11.3.1 Federal Planning Documents

III.11.3.1.1 Bureau of Land Management

There are multiple BLM land use plans in the DRECP area: the California Desert Conservation Area Plan, and the Caliente and Bishop Resource Management Plans. Chapter III.14 includes a discussion of applicable regulations and these plans, as amended by programmatic planning efforts such as the Solar Programmatic Environmental Impact Statement Record of Decision. Volume II, in the No Action Alternative discussion, addresses additional planning decisions applicable to the DRECP.

III.11.3.1.2 Bureau of Reclamation

Within the DRECP area, the Lower Colorado River Multi-Species Conservation Program covers lands under the Bureau of Reclamation's jurisdiction. These lands comprise more

than 400 miles of the lower Colorado River and historic 100-year floodplain from Lake Mead to the Mexico border.

III.11.3.1.3 Department of Defense

The Sikes Act of 1960, as amended, provides for Department of the Interior and DOD cooperation with state agencies in the planning, development, and maintenance of fish and wildlife resources on military reservations throughout the United States. Integrated Natural Resource Management Plans allow DOD to implement landscape-level management of its natural resources while coordinating with various stakeholders. Integrated Natural Resource Management Plans have been developed for each DOD installation within the DRECP area and include China Lake, Edwards, Twentynine Palms, Fort Irwin, Chocolate Mountains, and Barstow. DOD lands are described in Chapter III.24.

The DOD Siting Clearinghouse was established in the summer of 2010 and formally authorized by Congress through Section 358 of Public Law 111-383 in January 2011. Its purpose is to coordinate the DOD review of applications for projects that are filed with the Secretary of Transportation pursuant to Section 44718 of Title 49, United States Code, and referred to DOD by the Department of Transportation (specifically the Federal Aviation Administration). The Clearinghouse coordinates the efforts of all DOD components (including the Joint Staff, Army, Navy, Air Force, Marines, and other critical offices) in the assessment of project proposals and the development of official DOD positions on the impacts of those projects on military missions. The Clearinghouse website is: http://www.acq.osd.mil/dodsc/.

III.11.3.1.4 National Park Service

General management plans for NPS lands within the DRECP area include the Death Valley National Park General Management Plan (2002), Joshua Tree National Park General Management Plan (1995), and the Mojave National Preserve General Management Plan (2002), as discussed in the following sections.

III.11.3.1.4.1 Death Valley National Park General Management Plan

The Death Valley National Park General Management Plan (2002) expands existing Death Valley National Park management strategies and the NPS mission and policies to management of the resources within the lands added to the park in 1994. It also adds designation of 95% of the park as wilderness. The park seeks to protect resources commensurate with the visitor-use mandate as its highest priority, with no degradation of park values. The plan also strives to balance its resource preservation mission with specific mandates from Congress while disallowing degradation of park values.

III.11.3.1.4.2 Joshua Tree National Park General Management Plan

The Joshua Tree National Park General Management Plan (1995) expands existing Joshua Tree National Park management strategies and the NPS mission and policies to management of the resources within the park. The plan provides a framework for overall park management and identifies items needed to target its planning around several key issues. These issues include urban encroachment, renewable energy development and other adjacent land uses, wilderness status and conditions, and visitor-use issues including transportation facilities, local community needs, user conflicts, user capacity, and natural and cultural resource degradation from visitor use.

III.11.3.1.4.3 Mojave National Preserve General Management Plan

The vision for the Mojave National Preserve General Management Plan (2002) is to protect and perpetuate a natural environment and cultural landscape where the protection of self-sustaining native desert ecosystems is ensured for future generations. Educational opportunities and research activities concerning the natural and cultural environment are encouraged, and access for all visitors is ensured. The plan strives to perpetuate both the solitude and quiet, as well as the sense of discovery and adventure that exist today. The plan emphasizes minimum overall development that would detract from this setting. The plan depends upon communities to provide most visitor support services such as food, gas, and lodging.

III.11.3.2 State of California

Planning documents governing state lands within the DRECP area include Anza–Borrego Desert State Park, Red Rock Canyon State Park, Ocotillo Wells State Vehicular Recreation Area (SVRA), Heber Dunes SVRA, Arthur B. Ripley Desert Woodland State Park, Saddleback Butte State Park, Tomo-Kahni State Historic Park, and Antelope Valley California Poppy State Natural Reserve. The plans governing uses within these areas are discussed in the following sections. Information about planning documents for Arthur B. Ripley Desert Woodland State Park, Saddleback Butte State Park, and Tomo-Kahni State Historic Park is currently unavailable. The state Off-Highway Motor Vehicle Recreation Division proposes to acquire approximately 28,275 acres in Eastern Kern County that are interspersed within BLM parcels currently used for off-highway vehicle recreation, grazing, camping, and other activities. This area, when acquired, would be administered as an SVRA by the Off-Highway Motor Vehicle Recreation Division as a unit within the Hungry Valley District.

III.11.3.2.1 Anza–Borrego Desert State Park General Plan and Environmental Impact Report

The Anza–Borrego Desert State Park General Plan (2005) addresses some 600,000 acres in Eastern San Diego County, Southern Riverside County, and Western Imperial County. The General Plan provides guidelines for land use management within the park, including land acquisitions and the facilities required to accommodate an expected tourism increase. The General Plan delineates six management zones and sets general and specific goals and guidelines to guide park management. The General Plan also identifies recreational, operational, interpretive, and resource management opportunities and constraints consistent with their wilderness classifications (California Public Resources Code 5019.53 and 5019.68) and with the Department of Resource Management directives.

The General Plan identifies additional areas for the expansion of state wilderness by approximately 55,797 acres. It establishes the approximate 443-acre We-nelsch Cultural Preserve in the San Felipe Valley area to restrict development and uses for the protection of significant sensitive resources, in addition to establishing goals, guidelines, and management zones for resource management, facility operations, and accessible interpretive and recreational public programs.

III.11.3.2.2 Red Rock Canyon State Park General Plan Revision and Environmental Impact Report

Red Rock Canyon State Park occupies approximately 27,000 acres within the Mojave Sector of the Tehachapi District of the California State Park system and lies at the southernmost tip of the Sierra Nevada, where it converges with the El Paso Range. The park is approximately 25 miles northeast of Mojave and 80 miles east of Bakersfield in Kern County. It features various desert cliffs, buttes, and rock formations. The area was once home to the Kawaiisu Indians, who left petroglyphs in the El Paso Mountains and other evidence of their inhabitation. The park now protects significant paleontology sites and the remains of 1890s-era mining operations. The park includes two natural preserves and provides recreation activities, camping, sightseeing, equestrian activities, hiking, and opportunities for reflection and solitude.

The Red Rock Canyon State Park General Plan Revision is in process. The purpose of the General Plan Revision/Environmental Impact Report is to guide future development activities and management objectives within the park.

III.11.3.2.3 Ocotillo Wells State Vehicular Recreation Area General Plan Update

The Ocotillo Wells SVRA encompasses more than 85,000 acres and is open for off-highway vehicle exploration and recreation within its boundaries. Outside the boundaries, to the

south and east, large tracts of BLM land are also open to off-highway vehicle use. The western boundary and part of the northern boundary connect with the 500,000-acre Anza-Borrego Desert State Park, which is closed to off-highway vehicle recreation.

The Ocotillo Wells SVRA General Plan Update is currently underway. California State Parks has received public comments on draft preliminary goals addressing visitor experience and opportunities, resource management, interpretation and education, and other park operations.

III.11.3.2.4 Heber Dunes State Vehicular Recreation Area

Heber Dunes SVRA is 3 miles north of the U.S.–Mexico border, crossing at Highway 7 (Calexico/Mexicali) south of the city of El Centro and I-8, 8 miles east of the community of Heber in Imperial County. It encompasses 343 acres and is the most recent addition to the state's Off-Highway Motor Vehicle Recreation Division.

On December 1, 2011, the Off-Highway Motor Vehicle Recreation Commission approved the Heber Dunes SVRA General Plan and Environmental Impact Report. The General Plan outlines broad goals and guidelines for the management of Heber Dunes SVRA. The approval of the General Plan also allows facility improvements to the park. Proposed facility improvements include a maintenance and ranger station, staff and volunteer residence area, picnic areas, training track, and upgraded utilities and roads.

III.11.3.2.5 Antelope Valley California Poppy State Natural Reserve Resource Management Plan, General Development Plan, and Environmental Impact Report (1979)

The Antelope Valley California Poppy State Natural Reserve is on California's most consistent poppy-bearing land. Other wildflowers—owl's clover, lupine, goldfield, cream cups, and coreopsis, to name a few—share the desert grassland to produce a mosaic of color and fragrance each spring. The Antelope Valley is in the western Mojave Desert at elevations from 2,600 to 3,000 feet, making it a high desert environment.

The objective of the approximately 1,760-acre poppy reserve differs from other state reserves because it is intended "to make available significant displays of blooming poppies and associated wildflowers for visitor enjoyment" (1979). In addition, the plan seeks to protect important cultural, wildlife, visual, and recreational resources within the reserve while allowing visitor access. More than 97% of study area lands are included for natural preservation. Remaining areas include passive resource interpretation or active resource interpretation and administrative services. As discussed in the Resource Management Plan, "Power lines can be disruptive," and "Necessary utilities shall be located underground.

Construction of long-distance transmission lines across the reserve should be firmly resisted" (p. 11 of the Resource Management Plan).

III.11.3.3 Regional and County Planning Documents

Regional and county planning documents provide a guide to future physical planning. Land use authority for privately owned land is held by the specific city or county where the property is located. Local land use regulations, ordinances, and policies will apply to any future projects proposed on locally controlled jurisdictional lands. Summaries of the regional Habitat Conservation Plans and adopted county General Plans are provided in the following sections along with summaries of regulations specific to siting or promoting renewable energy projects within affected jurisdictions.

III.11.3.3.1 Imperial County General Plan

The Imperial County General Plan Land Use Element designates eight primary uses within the DRECP area boundaries. These are Agriculture, Community Area, Government/Special Public, Industry, Recreation/Open Space, Special Purpose Facility, Specific Plan Area, and Urban Area.

Much of the DRECP area lands covered by the Imperial County General Plan are classified as Agriculture. The county has made preservation of designated agricultural lands a priority. Industrial uses are generally not permitted on lands designated for agriculture except for those directly associated with agricultural products and processes, or for geothermal plants, which may be allowed with a conditional use permit subject to zoning and environmental reviews. Solar and wind energy facilities may be regulated differently than other types of power plants by implementing zoning requirements as part of conditional use permits.

Adopted in 2006, the Geothermal/Alternative Energy and Transmission Element provides guidance on the planning process for the development of geothermal/alternative energy resources and electrical transmission corridors. Imperial County is in the process of updating and amending the Geothermal/Alternative Energy Element of its General Plan through the Assembly Bill X1 13 funds received from the California Energy Commission. The county is revising ordinances, maps, and other required environmental documents.

III.11.3.3.2 Inyo County General Plan

Land Use Element

The Inyo County General Plan Land Use Element encompasses a variety of land uses that set the scale, pattern, and types of development for Inyo County within the DRECP area. These designations are grouped into four general categories: Residential, Commercial,

Industrial, and Other. The "Other" designation includes Open Space and Recreation, Public Service Facilities, Agriculture, Natural Resources, Natural Hazards, State and Federal Lands, and Tribal Lands/U.S. Bureau of Indian Affairs. The General Plan acknowledges that the majority of lands within the county are within the control of various state and federal land-holding agencies and the City of Los Angeles. Private lands in the county account for less than 2% of the land area. All lands owned by the Los Angeles Department of Water and Power are classified according to their proposed uses (e.g., Residential, Industrial). In 2011, the Planning Commission and the Board of Supervisors approved an update to the Inyo County General Plan to address renewable solar and wind energy development in the county. The update included a General Plan Land Use Designation Overlay and identified areas where it would be appropriate to develop renewable wind and solar energy resources. However, the county had to rescind its Renewable Energy General Plan Amendment due to California Environmental Quality Act litigation (Inyo County 2014a). Inyo County is working on completing its Renewable Energy General Plan Element through the Assembly Bill X1 13 grant funds received from the California Energy Commission.

Government Element

The Government Element focuses on the need for the coordination of land use decisions with lands managed by government agencies. Goal GOV-3 of this element addresses the loss of private lands and states: "To provide opportunities for the private ownership of land by maintaining and expanding, when possible, the amount of privately owned land available in the county" (Inyo County 2014b).

III.11.3.3.3 Kern County General Plan

Land Use, Open Space, and Conservation Element

The focus of the Land Use, Open Space, and Conservation Element is to provide "for a variety of uses for future economic growth while also assuring the conservation of Kern County's agricultural, natural, and resource attributes" (2009). Land Use, Open Space, and Conservation policies address a range of issues including air quality; archaeological, paleontological, cultural, and historical preservation; threatened and endangered species; surface water and groundwater; economic development; and oak tree conservation. Energy development is recognized as potentially conflicting with urban or other established uses.

Energy Element

The Kern County Energy Element defines critical energy-related issues facing the county and sets forth goals, policies, and implementation measures to both protect the county's energy resources and encourage orderly energy development while affording maximum protection of the public's health and safety and the environment. The general goal of the

Energy Element is to establish Kern County's position as California's leading energy producer, to encourage safe and orderly energy development within the county, and to become actively involved in the decisions and actions of other agencies as they affect energy development within Kern County. Some of the policies developed to achieve this goal concern wind, geothermal, and solar energy development follow:

- The goal of wind energy development policies is to promote the safe and orderly development of wind energy as a clean method of generating electricity while providing protection for the environment.
- The goal of geothermal development policies is to provide for the safe and orderly development of Kern County's geothermal resources, including direct-use applications of low- and moderate-temperature resources and electrical generation from high-temperature resources.
- Solar energy development policies recognize that solar energy represents a major potential resource due to favorable climatic conditions in the desert and valley regions of the county.

The Energy Element of the General Plan also contains policies and implementation measures that relate directly to other county plans and programs, including the Kern County Zoning Ordinance. This ordinance contains provisions and standards for most types of energy development and identifies two combining districts that set standards specifically for two types of energy development: the Wind Energy Combining District and the Petroleum Extraction Combining District.

III.11.3.3.4 Los Angeles County General Plan and Antelope Valley Area Plan

The Antelope Valley Areawide General Plan, in conjunction with other chapters and elements of the County of Los Angeles General Plan, is a coordinated statement of public policy developed by the County of Los Angeles for making important public decisions relating to the future of the Antelope Valley.

Through the Assembly Bill X1 13 grant funds received from the California Energy Commission, Los Angeles County has started creating a renewable energy ordinance to help mitigate development issues such as cumulative impacts. The county will also revise its renewable energy polices as it updates its General Plan and the Antelope Valley Area Plan. These policies will be the foundation for the ordinance.

Land Use

Under the draft plan, utility-scale renewable energy production facilities may be allowed in Rural Land designations without a plan amendment. Applications for these facilities,

however, require discretionary approval and are subject to California Environmental Quality Act and county environmental reviews and public hearings. Applications must be consistent with the relevant goals and policies of the Area Plan, especially Conservation and Open Space Element goals 10, 13, and 14, and all other related policies as presented in the Conservation and Open Space Element.

Utility installations are also compatible with nonurban, nonresidential land uses that include remote areas designated Non-Urban 1 (Antelope Valley Areawide General Plan, p. V1-5). See additional goals and policies of the County of Los Angeles General Plan (policies 2 and 3) and the Antelope Valley Areawide General Plan (policies 18, 19, 40, 65, 66, 69, 70, 101-103, 114, 135, 140, 141, and 217; 1986).

Conservation and Open Space Element: Significant Ecological Areas

The Significant Ecological Areas Program is a component of the Los Angeles County General Plan Conservation and Open Space Element. Significant ecological areas are ecologically important land and water systems that support valuable habitat for plants and animals. They are often essential for the preservation of rare, threatened, or endangered species and the conservation of biological diversity in Los Angeles County. Significant ecological areas are not preserves, but rather areas where the county deems it important to ensure a balance between development and resource conservation. The DRECP area encompasses all or portions of three significant ecological areas: Antelope Valley, Joshua Tree Woodlands, and San Andreas.

III.11.3.3.5 Riverside County General Plan

As stated in the Riverside County General Plan, a central vision for Riverside County is "the desire to maintain and enhance the character of Riverside County, including its extraordinary natural resources and unique communities, by clearly defining areas which are suitable for future growth and those which are suitable to be preserved and maintained." Growth should be directed to areas that are well served by public facilities and services; and significant environmental features—including drainage ways, lands subject to extreme natural hazards, or lands that offer scenic beauty—are to be preserved.

Land Use Element

The Riverside County General Plan Land Use Element identifies five foundation components, under which all designated land uses fall: Agriculture, Rural, Rural Community, Open Space, and Community Development. Much of the unincorporated portions of the county are divided into 19 area plans, 2 of which are in the DRECP area (Desert Center and Palo Verde Valley). Additional lands in the eastern portion of the county (referred to as the Eastern Riverside County Desert Areas) and within the DRECP area are

not within an approved area plan. The majority of unincorporated land is designated Open Space (which allows residential development at one dwelling per 20 acres). Lands designated Agriculture, Rural, and Rural Community, when combined with Open Space, comprise more than 98% of the eastern portion of the county.

The Rural Desert land-use designation is the only General Plan land use that specifically allows renewable energy projects, including solar, geothermal, and wind. The Rural Desert land use designation allows for single-family residences, limited agriculture, and animal keeping. In addition to allowing the renewable energy uses of solar, geothermal, and wind, as well as the associated uses required to develop and operate these renewable energy sources, allowed uses include limited recreational uses, compatible resource development (which may include the extraction of mineral resources with approval of a surface mining permit), and governmental and utility uses. The Rural Desert land use designation applies generally to remote desert areas characterized by poor access and lack of water and other services.

While lands designated Rural Desert specifically allow renewable energy development, countywide policies address the development of wind turbines as related to land use, visual resources, noise, and design.

Multipurpose Open Space Element

The Multipurpose Open Space Element policies of the General Plan both address the need to protect energy resources including renewable energy (wind, solar, geothermal, and biomass) resources, and recognize the importance of developing alternative energy resources. The following is relevant to the DRECP.

Wind Energy. Wind is a beneficial source of energy that also provides economic and revenue advantages to the county. Issues to be considered when developing new wind energy conversion systems include aesthetics, safety, noise, air navigation interferences, land use, wildlife and general ecology, slopes and erosion, particulate matter (PM_{10} and $PM_{2.5}$) and dust control, and wind access and equity. Policy Open Space10.1 identifies the need to provide for orderly and efficient wind energy development that maximizes beneficial uses of wind resources and minimizes detrimental effects to residents and the environment. Policy Open Space 10.2 provides for continuation of the county's Wind Implementation Monitoring Program to study the evolution of wind energy technology, identify the means to solve environmental and community impacts, and provide for the ability to respond with changes in the county's regulatory structure. Additional countywide policies are discussed earlier in the section for the Land Use Element.

Solar Energy. The Riverside County General Plan identifies the following policies for the protection and use of solar energy, either through development of systems to convert solar

energy to electricity or through passive solar systems incorporated into building design. General Plan policies call for enforcement of the state's Solar Shade Control Act, which promotes all feasible means of energy conservation and uses of alternative energy supply sources, encourages efforts to provide active and passive solar access opportunities in new developments, and permits and encourages the use of passive solar devices and other state-of-the-art energy resources (OS 11.1, 11.2 and 11.3, respectively).

Geothermal Resources. The General Plan recognizes that geothermal resources can be used to produce electricity but cautions that geothermal development should not negatively affect the environment. There is no active geothermal energy production in the county, though geothermal resources do exist. County policies (Open Space 12.1–12.3) provide direction for proposals for the development of geothermal resources. In general, development of nonelectrical, direct-heat uses of geothermal heat and fluids for space, agricultural, and industrial heating may be allowed but only after consideration of the potential impacts to environmental, cultural, aesthetic, archaeological, and social resources. Policies also require that the benefits of development be weighed against the potential negative effects of hot springs, geysers, and other thermal features upon ecological, educational, and recreational values.

III.11.3.3.6 San Bernardino County General Plan

San Bernardino County's General Plan was adopted in 2007. The DRECP area includes a majority of the land in San Bernardino County. The General Plan Land Use Element designates primary uses in the General Plan within the boundaries of the DRECP area. The Conservation Element addresses the conservation, development, and use of natural resources and includes the goals, policies, and programs that ensure that these resources are preserved to the greatest extent feasible.

San Bernardino County has also received grant funds from the California Energy Commission. The county is developing a new Renewable Energy and Conservation Element for its General Plan. The county also plans to make strategic changes to its regulatory system with code updates associated with the new General Plan Element.

III.11.3.3.7 San Diego County General Plan

The County of San Diego General Plan anticipates significant pressure on natural resources and increased demand for energy due to a projected population increase of 38% by 2030 and its corresponding demand for new housing and related energy uses.

Open Space and Conservation Element

General Plan goals and policies in the Open Space and Conservation Element include guidance measures to accommodate renewable energy while protecting resources. In addition, county ordinances have been adopted regarding renewable energy development, as noted below.

Renewable Energy Facility Permitting

The County of San Diego adopted Ordinance No. 10073, Ordinance Amending the San Diego County Zoning Ordinance Related to Small, Medium, and Large Wind Turbine Systems, which defines and establishes setback, height, noise, and other requirements for facility installations, and Ordinance No. 10072, the Solar Energy Ordinance.

III.11.4 Land Ownership and Use by Ecoregion Subarea

The DRECP area has been divided into 10 ecoregion subareas, based on vegetation communities and geographic conditions. These ecoregion subareas do not follow jurisdictional boundaries. Lands within these ecoregion subareas include private land holdings subject to the planning authority of applicable county or incorporated cities, as well as tribal, state, and federal lands. A description of the land use within the DRECP area ecoregion subareas is provided in the following sections.

Land uses on federal- and state-managed lands are described in Sections III.11.2.1 and III.11.2.2, respectively. BLM land uses are discussed in Chapter III.14.

III.11.4.1 Cadiz Valley and Chocolate Mountains Ecoregion Subarea

The Cadiz Valley and Chocolate Mountains ecoregion subarea includes the northeastern portion of Imperial County, and Eastern Riverside and San Bernardino counties, encompassing approximately 3,052,000 acres. Table R1.11-3a (presented in Appendix R1) provides a detailed breakdown of land ownership acreage. The largest landowner in this ecoregion subarea is the federal government, with approximately 2,590,000 acres. State and tribal[1] lands make up 57,000 acres and 39,000 acres, respectively. The remaining lands (approximately 366,000 acres) are under the ownership of regional and local agencies or districts, or private entities. As shown in Figure R1.11-3a in Appendix R1, lands are generally in public ownership, with the largest holdings under the jurisdiction of BLM. Land ownership within the ecoregion subarea also includes DOD lands, NPS lands, USFWS

[1] There are no participating tribes in the Draft DRECP to date; therefore, DRECP decisions would not apply to tribal lands. The data provided in this section is for informational purposes only.

lands, CSLC lands, State Parks lands, and private lands. There is also an area of tribal lands in the northeastern portion of the ecoregion subarea; but because there are no participating tribes, DRECP recommendations would not apply to these tribal lands. Figure R1.11-1b in Appendix R1 shows the General Plan land uses adopted by Imperial, Riverside, and San Bernardino counties. Agriculture and residential uses are concentrated near the Colorado River in Eastern Imperial and Riverside counties, and near the junctions of major transportation corridors. Areas of open space are found throughout the ecoregion subarea. Table R1.11-3b (presented in Appendix R1) provides a detailed breakdown of adopted land uses by county. Table III.11-2 provides a summary of land use.

Table III.11-2
Cadiz Valley and Chocolate Mountains Ecoregion
Subarea Summary of Land Use by County (acres)

Land Use	Acres
Imperial County	*642,597*
Federal	564,428
State	11,802
County – Designated Land Use	66,336
Tribal	31
Riverside County	*1,613,995*
Federal	1,327,833
State	32,807
County – Designated Land Use	241,281
Tribal	12,074
San Bernardino County	*795,391*
Federal	697,272
State	12,622
County – Designated Land Use	58,540
Tribal	*26,957*
Designated Land Use: Cadiz Valley and Chocolate Mountains Ecoregion Subarea Total Acres	**3,051,983**

Note: All acreages derived from best available data.

III.11.4.2 Imperial Borrego Valley Ecoregion Subarea

The Imperial Borrego Valley ecoregion subarea includes the southeastern portion of San Diego County and a majority of Imperial County (excluding the northeastern portion), and encompasses approximately 2,410,000 acres: approximately 1,150,000 acres of federal land, approximately 287,000 acres of state lands, approximately 56,000 acres of tribal lands, and approximately 92,000 acres of other lands (e.g., municipalities, nonprofits, and public utility districts). Table R1.11-4a (presented in Appendix R1) provides a detailed breakdown of land ownership acreage. As shown in Figure R1.11-2a

in Appendix R1, lands are mostly under federal management, with a large portion of privately owned lands within the central portion of the ecoregion subarea. Land management within the ecoregion subarea includes BLM, DOD, Bureau of Reclamation, USFWS, California State Parks, CDFW, CSLC, and private lands. There is also an area of tribal lands in the southeastern portion of the ecoregion subarea; but because there are no participating tribes, DRECP recommendations would not apply to tribal lands. Figure R1.11-2b in Appendix R1 shows the General Plan land uses as adopted by Imperial and San Diego counties. Agriculture uses are concentrated in the center portion of the ecoregion subarea, with open space uses to the east and west. Table R1.11-4b (presented in Appendix R1) provides a detailed breakdown of adopted land uses by county. Table III.11-3 provides a summary of acreage by land use.

Table III.11-3
Imperial Borrego Valley Ecoregion Subarea Summary of Land Use by County (acres)

Land Use	Acres
Imperial County	*2,130,853*
Federal	1,138,550
State	89,116
County – Designated Land Use	847,234
Tribal	55,952
Riverside County	*11,667*
Federal	11,642
State	16
County – Designated Land Use	8
Tribal	0
San Diego County	*267,594*
Federal	174
State	197,639
County – Designated Land Use	69,782
Imperial Borrego Valley Ecoregion Subarea Total Acres	**2,410,114**

Note: All acreages derived from best available data.

III.11.4.3 Kingston and Funeral Mountains Ecoregion Subarea

The Kingston and Funeral Mountains ecoregion subarea includes the southeastern portion of Inyo County and northeastern portion of San Bernardino County. As shown in Figure R1.11-3a in Appendix R1, lands are generally in public ownership with the largest holdings under the jurisdiction of the BLM and NPS. Land ownership within the ecoregion subarea also includes CSLC, CDFW, and private lands. Of the approximately 2,470,000 acres in this ecoregion subarea, approximately 2,321,000 acres are under federal ownership,

approximately 83,000 acres are under state ownership, and the remaining approximately 66,000 acres are under the jurisdiction or ownership of other public and private entities (e.g., municipalities, nonprofits, and public utility districts). Table R1.11-5a (presented in Appendix R1) provides a detailed breakdown of land ownership acreage.

Figure R1.11-3b in Appendix R1 shows the General Plan land uses as adopted by San Bernardino County. Open space is the predominant land use within the ecoregion subarea. Areas of residential use are scattered along Highway 164 and I-15. Table R1.11-5b (presented in Appendix R1) provides a detailed breakdown of adopted land uses by county. Table III.11-4 provides a summary of acreage by land use.

Table III.11-4
Kingston and Funeral Mountains Ecoregion Subarea
Summary of Land Use by County (acres)

Land Use	Acres
Inyo County	*1,201,867*
Federal	1,133,990
State	37,976
County – Designated Land Use	29,901
San Bernardino County	*1,268,179*
Federal	1,186,994
State	45,348
County – Designated Land Use	35,838
Kingston and Funeral Mountains Ecoregion Subarea Total Acres	**2,470,047**

Note: All acreages derived from best available data.

III.11.4.4 Mojave and Silurian Valley Ecoregion Subarea

The Mojave and Silurian Valley ecoregion subarea, which encompasses approximately 2,644,000 acres, is mostly within San Bernardino County but does include a small portion of Eastern Kern County. As shown in Figure R1.11-4a in Appendix R1, lands are generally in public ownership, with the largest holdings (approximately 2,400,000 acres) under the federal jurisdiction of BLM, DOD, and NPS. Land ownership within the ecoregion subarea also includes state lands (approximately 39,000 acres) under the jurisdiction of the CSLC and CDFW. The remaining approximately 205,000 acres are under the ownership of other public and private entities (e.g., municipalities, nonprofits, and public utility districts). Table R1.11-6a (presented in Appendix R1) provides a detailed breakdown of land ownership by acreage.

Figure R1.11-4b in Appendix R1 shows the General Plan land uses as adopted by Kern and San Bernardino counties. Residential uses are mostly concentrated near Barstow along I-15

and I-40. Open space and military uses constitute the majority of the uses in the ecoregion subarea. Table R1.11-6b (presented in Appendix R1) provides a detailed breakdown of adopted land uses by county. Table III.11-5 provides a summary of acres by land use.

Table III.11-5
Mojave and Silurian Valley Ecoregion Subarea Summary of Land Use by County (acres)

Land Use	Acres
Kern County	*22,347*
Federal	19,393
State	144
County – Designated Land Use	2,810
San Bernardino County	*2,621,752*
Federal	2,380,627
State	39,379
County – Designated Land Use	201,746
Mojave and Silurian Valley Ecoregion Subarea Total Acres	**2,644,100**

Note: All acreages derived from best available data.

III.11.4.5 Owens River Valley Ecoregion Subarea

The Owens River Valley ecoregion subarea encompasses 417,558 acres and is entirely within western Inyo County. As shown in Figure R1.11-5a in Appendix R1, the majority of lands in this ecoregion subarea are managed by federal agencies (approximately 193,000 acres) such as BLM, DOD, and NPS. Lands under state ownership (e.g., CSLC and CDFW) total approximately 2,500 acres. In addition, there are 567 acres of tribal lands. The remaining approximately 221,000 acres are under the ownership of other public and private entities (e.g., municipalities, nonprofits, and public utility districts, etc.). Table R1.11-7a (presented in Appendix R1) provides a detailed breakdown of land ownership acreage. Table R1.11-7b (presented in Appendix R1) provides a detailed breakdown of adopted land uses by county. Table III.11-6 provides a summary of acres by land use.

Table III.11-6
Owens River Valley Ecoregion Subarea Summary of Land Use by County (acres)

Land Use	Acres
Inyo County	*417,558*
Federal	193,403
State	2,559
County – Designated Land Use	221,029
Tribal	*567*
Owens River Valley Ecoregion Subarea Total Acres	**417,558**

Note: All acreages derived from best available data. The acreage provided for State lands only includes CSLC school lands and CDFW land and not the Owens Lake (sovereign land) owned by the CSLC.

III.11.4.6 Panamint Death Valley Ecoregion Subarea

The Panamint Death Valley ecoregion subarea encompasses approximately 1,937,000 acres and includes Northwestern San Bernardino County, portions of Eastern Inyo County, and a small portion of Northeastern Kern County. As shown in Figure R1.11-6a in Appendix R1, the majority of lands within this ecoregion subarea are under federal ownership (approximately 1,878,000 acres) by NPS, BLM, and DOD. There are scattered areas of CSLC and private lands throughout the ecoregion subarea. State lands total approximately 33,000 acres and are under the jurisdiction of the CSLC, CDFW, and California State Parks. The remaining approximately 26,000 acres are under the ownership of other public and private entities (e.g., municipalities, nonprofits, and public utility districts). Table R1.11-8a (presented in Appendix R1) provides a detailed breakdown of land ownership acreage. Figure R1.11-6b in Appendix R1 shows the General Plan land uses as adopted by San Bernardino County. The southern portion of the ecoregion subarea contains a mixture of open space and military uses. Table R1.11-8b (presented in Appendix R1) provides a detailed breakdown of adopted land uses by county. Table III.11-7 provides a summary of acres by land use.

Table III.11-7
Panamint Death Valley Ecoregion Subarea Summary of Land Use by County (acres)

Land Use	Acres
Inyo County	*1,251,252*
Federal	1,226,250
State	16,108
County – Designated Land Use	8,894
Kern County	*81,330*
Federal	73,241
State	4,242
County – Designated Land Use	3,846
San Bernardino County	*604,820*
Federal	578,883
State	12,225
County – Designated Land Use	13,711
Panamint Death Valley Ecoregion Subarea Total Acres	**1,937,402**

Note: All acreages derived from best available data.

III.11.4.7 Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

The Pinto Lucerne Valley and Eastern Slopes ecoregion subarea includes a portion of Northern Riverside and San Bernardino counties and encompasses approximately 2,319,000 acres. As shown in Figure R1.11-7a in Appendix R1, lands are generally in public ownership, with the largest holdings under the federal jurisdiction (approximately 1,750,000 acres) of BLM,

NPS, and DOD. Land ownership within the ecoregion subarea also includes state lands (approximately 40,000 acres) under the jurisdiction of the CSLC and CDFW. There are 158 acres of tribal lands. The remaining approximately 528,000 acres are under the ownership of other public and private entities (e.g., municipalities, nonprofits, and public utility districts). Table R1.11-9a (presented in Appendix R1) provides a detailed breakdown of land ownership acreage. Figure R1.11-7b in Appendix R1 shows the General Plan land uses adopted by Riverside and San Bernardino counties. A swath of residential use runs from the Apple Valley area in the west to the Twentynine Palms area in the east and is generally surrounded by open space. Table R1.11-9b (presented in Appendix R1) provides a detailed breakdown of adopted land uses by county. Table III.11-8 provides a summary of acres by land use.

Table III.11-8
Pinto Lucerne Valley and Eastern Slopes
Ecoregion Subarea Summary of Land Use by County (acres)

Land Use	Acres
Riverside County	*521,744*
Federal	506,738
State	4,319
County – Designated Land Use	10,689
San Bernardino County	*1,796,972*
Federal	1,243,504
State	35,686
County – Designated Land Use	517,623
Tribal	158
Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea Total Acres	**2,318,717**

Note: All acreages derived from best available data exclusive of federal, state and tribal landholdings.

III.11.4.8 Piute Valley and Sacramento Mountains Ecoregion Subarea

The Piute Valley and Sacramento Mountains ecoregion subarea is entirely within San Bernardino County and encompasses approximately 1,091,951 acres. As shown in Figure R1.11-8a in Appendix R1, the majority of lands in this ecoregion subarea are under the federal jurisdiction (approximately 955,000 acres) of BLM, NPS, and USFWS. State land ownership within the ecoregion subarea includes approximately 32,000 acres under CSLC and CDFW jurisdiction. There are also areas of tribal lands (approximately 36,000 acres) in the eastern portion of the ecoregion subarea. The remaining approximately 69,000 acres are under the ownership of other public and private entities (e.g., municipalities, nonprofits, and public utility districts). Table R1.11-10a (presented in Appendix R1) provides a detailed breakdown of land ownership acreage. Figure R1.11-8b in Appendix R1 shows the General Plan land uses adopted by San Bernardino County. Open space is the predominant use throughout the ecoregion subarea, with a mixture of other land uses—including residential—clustered along the border with Arizona. Table R1.11-10b

(presented in Appendix R1) provides a detailed breakdown of adopted land uses by county. Table III.11-9 provides a summary of acres by land use.

Table III.11-9
Piute Valley and Sacramento Mountains Ecoregion
Subarea Summary of Land Use by County (acres)

Land Use	Acres
San Bernardino County	*1,091,951*
Federal	954,735
State	32,270
County – Designated Land Use	68,620
Tribal	36,325
Piute Valley and Sacramento Mountains Ecoregion Subarea Total Acres	**1,091,951**

Note: All acreages derived from best available data.

III.11.4.9 Providence and Bullion Mountains Ecoregion Subarea

The Providence and Bullion Mountains ecoregion subarea is entirely within San Bernardino County and encompasses approximately 2,615,000 acres. As shown in Figure R1.11-9a in Appendix R1, land ownership is predominantly federal (approximately 2,341,000 acres) and includes BLM, DOD, and NPS. Land ownership within the ecoregion subarea also includes state lands (approximately 69,000 acres) under the jurisdiction of the CSLC, California State Parks, CDFW, and the University of California. The remaining approximately 205,000 acres are under the ownership of other public and private entities (e.g., municipalities, nonprofits, and public utility districts). Table R1.11-11a (presented in Appendix R1) provides a detailed breakdown of land ownership acreage. Figure R1.11-9b in Appendix R1 shows the general land uses adopted by San Bernardino County. Open space is the predominant use, with residential use scattered sporadically throughout the ecoregion subarea. Table R1.11-11b (presented in Appendix R1) provides a detailed breakdown of adopted land uses in the county. Table III.11-10 provides a summary of acreage by land use.

Table III.11-10
Providence and Bullion Mountains Ecoregion
Subarea Summary of Land Use by County (acres)

Land Use	Acres
San Bernardino County	*2,615,216*
Federal	2,341,279
State	69,379
County – Designated Land Use	204,558
Providence and Bullion Mountains Ecoregion Subarea Total Acres	**2,615,216**

Note: All acreages derived from best available data.

III.11.4.10 West Mojave and Eastern Slopes Ecoregion Subarea

The West Mojave and Eastern Slopes ecoregion subarea includes lands within Inyo, Kern, Los Angeles, and San Bernardino counties and encompasses 3,627,169 acres. Federal land ownership includes approximately 1,420,000 acres. As shown in Figure R1.11-10a in Appendix R1, BLM is the single largest land manager in the ecoregion subarea. Land ownership within the ecoregion subarea also includes DOD lands. State lands (approximately 41,000 acres) are under the jurisdiction of California State Parks, CDFW, and CSLC. The remaining approximately 2,166,000 acres are under the ownership of other public and private entities (e.g., municipalities, nonprofits, and public utility districts). Table R1.11-12a (presented in Appendix R1) provides a detailed breakdown of land ownership acreage. Figure R1.11-10b in Appendix R1 shows the General Plan land uses adopted by Kern, Los Angeles, and San Bernardino counties. Land uses in the ecoregion subarea are diverse and include agriculture, open space, residential, government and public facilities, and industrial. Table R1.11-12b (presented in Appendix R1) provides a detailed breakdown of adopted land uses by county. Table III.11-11 provides a summary of acreage by land use.

Table III.11-11
West Mojave and Eastern Slopes Ecoregion
Subarea Summary of Land Use by County (acres)

Land Use	Acres
Inyo County	*116,739*
Federal	113,968
State	524
County – Designated Land Use	2,247
Kern County	*1,642,637*
Federal	728,500
State	23,563
County – Designated Land Use	890,343
Tribal	231
Los Angeles County	*680,066*
Federal	54,673
State	5,473
County – Designated Land Use	619,920
San Bernardino County	*1,187,369*
Federal	523,092
State	11,279
County – Designated Land Use	652,999
West Mojave and Eastern Slopes Ecoregion Subarea Total Acres	**3,627,169**

Note: All acreages derived from best available data.

III.11.4.11 Land Ownership and Use—Bureau of Land Management Land

The BLM LUPA Decision Area encompasses approximately 10 million acres of BLM-administered lands in the 10 ecoregion subareas of the DRECP area, in addition to the BLM-administered lands that are within CDCA but outside of the DRECP, as shown in Table III.11-12.

Table III.11-12
Total Acres of BLM Ownership in LUPA Decision Area

DRECP	Acres
DRECP Ecoregion Subarea:	
Cadiz Valley and Chocolate Mountains	2,209,662
Imperial Borrego Valley	854,146
Kingston and Funeral Mountains	1,184,484
Mojave and Silurian Valley	1,003,000
Owens River Valley	189,067
Panamint Death Valley	457,137
Pinto Lucerne Valley and Eastern Slopes	882,996
Piute Valley and Sacramento Mountains	933,462
Providence and Bullion Mountains	1,415,824
West Mojave and Eastern Slopes	878,490
DRECP Total	**10,008,268**
CDCA Outside of DRECP Area	**Acres**
BLM lands in CDCA but outside of DRECP	**1,084,830**
LUPA Decision Area Total (DRECP plus CDCA outside of DRECP)	**11,093,098**

Due to rounding, total is slightly different from value for BLM lands on Table III.11-1.

III.11.5 Land Ownership and Use Outside of DRECP Area

Local governments determine the type and intensity of land uses allowed in lands under their jurisdictions. The uses permitted on lands within city or county jurisdictions are determined by local General Plans, Specific Plans, and the zoning ordinances enacted to implement them. Typically, some uses are allowed as a matter of right while others are discretionary and require review and approval for a conditional use permit. Within overall use classifications—such as Residential, Commercial, or Industrial—there can be wide variations in the specific uses allowed, as well as their densities. For example, areas zoned Residential can include density subcategories ranging from very low (such as 1 single-family residence per 80 acres), to high urban (such as high-rise condominiums and apartments). Commercial, Industrial, and Other Use classifications also vary in their applicable allowances and prohibitions. Not all jurisdictions permit all types of land use within their borders.

As prescribed by the California Public Utilities Code, the California Public Utilities Commission has authority over approval of transmission and substation facilities and their siting on lands under local city or county jurisdictions. Even though the California Public Utility Commission's authority supersedes local authority, the agency endeavors to be consistent with local plans and policies to the extent feasible and considers these when evaluating proposed facilities and locations.

Development of facilities on federal land requires federal agency approval since this land is not under state jurisdiction. Similar to local jurisdictions, federal agencies such as BLM and USFS provide for uses and activities on the lands they administer. Plans prepared by these agencies typically include provisions for recreation and resource development (e.g., mining) as well as manage conservation and resource protection areas. Based on federal legislation and agency regulations, each agency establishes which uses are allowed and where they can occur. The agencies have specific processes and requirements to consider amendments to their land use or land management plans. Other federal agencies, such as DOD or the Bureau of Reclamation, also have land in their respective jurisdictions and determine the allowable uses of these properties. Some federal land is highly restricted in its allowed uses, such as at military installations or in designated wilderness areas, while other federal land is more flexible and open to alternate uses.

Transmission lines are linear facilities, extending ribbon-like for many miles across the land. They terminate at substations or switchyards before rejoining the transmission system. Transmission line voltage is either increased (stepped up) or decreased (stepped down) at substations. Outside the DRECP area, it is expected that electricity generated from renewable generation sources will be delivered via the existing transmission system, which may require upgrading or expanding. The need for additional substations is not anticipated.

Transmission lines and substation facilities outside the DRECP area would likely be located in a variety of remote, rural, suburban, and urban settings, depending upon electricity demand.

III.11.5.1 Transmission Lines

Most new transmission lines connecting the DRECP area to load centers are expected to be within corridors where existing transmission lines have already been built and are operational. New transmission lines in these corridors would introduce additional towers and conductors into the landscape.

From the DRECP area, new transmission lines would head south and west to load centers in the Los Angeles and San Diego regions and north to the San Francisco Bay Area.

Transmission lines into the Los Angeles and San Diego regions would traverse two distinct and vastly different landscapes: undeveloped or minimally developed land and highly developed land. Most new lines would need to traverse the desert and mountains between the remote renewable energy facilities and existing transmission tie-ins. In most instances, the desert and mountain areas are sparsely settled and are in a mix of public, private, and tribal ownership. Outside of the desert and mountains, much of the relatively flat land is occupied by expanses of suburban and urban development. This includes residential uses at varying densities, commercial and office uses, light and heavy industrial uses, recreation, and institutional uses.

A transmission line heading north to the San Francisco Bay Area from the DRECP area would pass through sparsely populated mountains and then through either orchards and cropland or the foothill grasslands of the Western Central Valley.

III.11.5.1.1 San Diego Area

New transmission lines from the DRECP area to the San Diego area would be in the existing Sunrise 500/230 kV transmission corridor, which extends from Imperial County to substations near Alpine (Suncrest Substation) and Poway (Sycamore Substation). The transmission corridor roughly parallels I-8 and runs alternately north and south of that interstate highway.

From Ocotillo in Imperial County into San Diego County, most of the alignment is through open desert characterized by flat valley floors, outwash plains, and rugged mountains. In Eastern San Diego County, the land becomes hilly; supports scattered, relatively low vegetation; and is dominated by rocky landforms. Jacumba, Boulevard, and Buckman Springs are small communities along the corridor. Residences and businesses are located at low density throughout the region. There are relatively few public roads. Except in isolated communities, land use intensity is low. There is agricultural activity in some valley locations. Much of the area is administered by either BLM or USFS (Cleveland National Forest). As the corridor nears Alpine, the frequency and density of residences increase.

Starting at Alpine and continuing west, the alignment traverses a mixed rural and suburban landscape that extends through Lakeside to Poway. The corridor itself is primarily on ridges and slopes above low- to moderate-density suburban development. It passes to the north of Moreno and Santee and south of Poway, where it reaches Sycamore Substation outside Marine Corps Air Station Miramar. The corridor does not pass through any highly urbanized areas.

III.11.5.1.2 Los Angeles Area

Renewable electricity from the DRECP area would be delivered into the Los Angeles area by way of Vincent Substation, which is south of the city of Palmdale in northern Los Angeles County. From the Vincent Substation, transmission lines could follow different paths. One would be along the existing Tehachapi Renewable Transmission Project (TRTP) Segment 11 corridor to the Mesa Substation in Monterey Park and the Lighthipe Substation near Paramount. Another path would be in the existing TRTP segments 6 and 7 corridors, located east of the TRTP Segment 11 corridor, then on to Mesa Substation.

Both the TRTP Segment 11 and TRTP segments 6 and 7 corridors traverse the rugged mountain terrain of the Angeles National Forest, from the Vincent Substation near Highway 14 to just north of I–210. Both corridors cross the Pacific Crest Trail. Land use in the Angeles National Forest is largely recreation, conservation, and resource protection. There are no occupied structures in the two corridors. TRTP Segment 11 skirts highly suburbanized Altadena on the north before exiting the Angeles National Forest near Eaton Canyon Park on the east side of Altadena. The corridor immediately enters the dense suburban development of the Pasadena area and communities to the south. TRTP segments 6 and 7 corridors leave USFS lands at Duarte, near the San Gabriel River. Within the Angeles National Forest, both routes cross steep mountainous terrain.

Upon leaving the Angeles National Forest, the corridors immediately enter and cross the dense suburban landscape of the I-201 and I-10 corridors. There is little transition between the undeveloped lands of the Angeles National Forest and the highly developed suburban and urban landscapes in the flatlands. The built environment is dominated by single-family residential properties and local streets. The TRTP segments 6 and 7 corridors follow the San Gabriel River before turning west near Highway 60 (Pomona Freeway) to the Mesa Substation. The existing corridors are used for open space and contain nursery and agricultural production. There is vehicle parking at some locations. South from Mesa Substation to Lighthipe Substation, a single transmission corridor continues through dense suburban development characterized by a mix of single-family and multi-family residential uses and commercial and light industrial development. The corridor right-of-way itself supports open space and agricultural uses. At the City of Commerce, the corridor passes through an extensive light industry and warehousing district. The corridor here is often used for parking and outdoor storage. The corridor continues south through residential and commercial/industrial areas to the Lighthipe Substation.

Another possible corridor is from Vincent Substation to the upgraded Los Angeles Department of Water and Power Station E Substation in North Hollywood. As with the two other 500 kV transmission corridors coming from Vincent Substation, this route would traverse the mountainous USFS lands of the Angeles National Forest before emerging into

urbanized greater Los Angeles north of I-210 near Big Tujunga Creek and Wash in Lake View Terrace. The existing right-of-way through the urban area supports open space and agricultural uses and passes through residential, commercial, and light industrial areas.

III.11.5.1.3 North Palm Springs–Riverside Area

Renewable energy from facilities in the DRECP area would flow to load centers through transmission lines that generally follow the I-10 corridor in Riverside County. Multiple 500 kV lines would be constructed in existing transmission corridors. A number of circuits would be required between some substations in existing corridors. The primary corridor would be from the Colorado River Substation within the DRECP area to the Devers, Rancho Vista, and Lugo substations. A second corridor would be between the Imperial Irrigation District's new Midway X Substation and Devers Substation. A third corridor would be between the Devers and Valley substations.

The Colorado River Substation to Lugo corridor passes through both undeveloped and developed land. The portion of the corridor along I-10 between Colorado River Substation and Devers Substation near Palm Springs is in the desert and characterized by flat outwash plains and rugged mountains. The corridor is in the Chuckwalla and Shavers valleys, which separate the Eagle Mountains to the north and the Orocopia and Chuckwalla mountains to the south. Existing transmission lines and gas pipelines parallel the highway. West of the DRECP area, the corridor includes the small communities of Desert Center and Chiriaco Summit on I-10. A civil airport is located at Chiriaco Summit. Joshua Tree National Park is north of I-10.

Continuing west, the transmission line corridor enters the Coachella Valley at Indio, near where I-10 and Highway 86 merge. The landscape remains a sparsely vegetated desert, but areas of extensive development are there as well. The transmission corridor into and out of Devers Substation is north of I-10, while most residential and commercial development in the area is in Palm Springs and other communities south of I-10. The corridor in this area passes through extensive wind farm development on BLM and private land in the Whitewater and San Gorgonio Pass areas. Farther west, the corridor continues through the pass north of developed areas in Cabazon, Banning, and Beaumont. The character of these communities is suburban residential with pockets of commercial, intermixed with pastureland. Development becomes increasingly frequent and denser as the corridor moves west.

The corridor then crosses to the south side of I-10 and enters The Badlands, a mountainous area between Redlands and Moreno Valley. The corridor in this area roughly parallels San Timoteo Canyon Road for part of its length. There are scattered agricultural and residential properties in this area, but much of the route is open space. Emerging from The Badlands

south of Loma Linda in San Bernardino County, the corridor continues west through a mixture of residential, commercial, and light industrial uses and passes over the Santa Ana River. At the city of Ontario, the corridor turns north through an industrial part of Rancho Cucamonga and continues parallel to I-15. Leaving the developed valley floor, the corridor crosses Lytle Creek and Cajon Wash. Continuing north and northeast, the corridor passes through this mountainous, sparsely populated area. The corridor turns northeast south of Cajon Junction and crosses the Pacific Crest Trail near Highway 138 before continuing to Lugo Substation near Hesperia.

The corridor from the new Imperial Irrigation District Midway X Substation in Imperial County to Devers Substation would also traverse sparsely populated desert. This corridor is east of the Salton Sea and continues through open country northwest to east of the Coachella Canal until it intersects the I-10 corridor east of Indio. After crossing I-10, the corridor continues west into Devers Substation.

From Devers Substation, the corridor to Valley Substation passes through wind farms in the area and crosses to the south side of I-10 before passing small residential areas near Cabazon and Banning. South of Beaumont, the corridor passes over the unpopulated lower elevations of the San Jacinto Mountains before descending into irrigated agricultural land between Gillman Springs Road and Ramona Expressway. After crossing the expressway, the corridor ascends into the hilly terrain of Lake View Mountains, which is primarily open space with some scattered residential properties. The corridor descends to open land and an area of mixed residential and agricultural uses before turning south of the community of Nuevo and reaching Valley Substation in Romoland.

Another potential corridor extends from Rancho Vista Substation in Rancho Cucamonga to Serrano Substation near Anaheim Hills. It would pass through industrial development east of I-15 before crossing into a mixed warehousing and agricultural area south of Highway 60. The route would pass along the north side of the residential community of Eastvale and continue east through a mix of residential and commercial land uses, agricultural areas, feedlots, and a golf course, before reaching the Chino Hills near Highway 71. The rolling Chino Hills are characterized by grassland and shrub vegetation, with no development. The corridor emerges from the hills in Yorba Linda and continues south across Yorba Linda Boulevard and Highway 91 along Deer Canyon Park. This area outside the corridor has dense suburban residential development. The corridor continues across the Anaheim Hills Golf Course and arrives at the Serrano Substation off Cannon Street, just south of Anaheim Hills.

III.11.5.1.4 Central Valley

The transmission corridor from Whirlwind Substation in the DRECP area crosses over the Tehachapi Mountains to the San Joaquin Valley south of Arvin, then continues north along the I-5 corridor connecting with the Midway, Gates, and Los Banos substations before ending at the Tesla Substation near Tracy.

Heading northwest from Whirlwind Substation, located near Rosamond, the corridor crosses the Pacific Crest Trail and enters the Tehachapi Mountains. The mountains are very sparsely populated, and there are no roads or residences in the corridor through them.

Upon reaching the San Joaquin Valley, the mountains transition immediately to irrigated agricultural land in the valley, with scattered farmsteads and outbuildings. Roads are widely spaced and in grid patterns typical of flat farmland. The transmission corridor continues through agricultural land and across local roads before crossing Highway 99 and turning north to parallel I-5 to the east. Near Rosedale, the corridor turns west to cross I-5 and continues northwest to Buttonwillow, where Midway Substation is located. From the substation, the corridor continues north through agricultural land and crosses to the east side of I-5 through cropland, orchards, and pasture. Approximately 15 miles north of Kettleman City, the corridor alignment again crosses to the west of I-5 and continues north in the rolling grassland foothills of the Coast Ranges. From Kettleman City north to the end of the corridor, I-5 essentially marks the boundary between agricultural land to the east and foothills to the west. Near Patterson, the corridor diverges northwest from I-5 to follow I-580 to the Tesla Substation west of Tracy, in the Altamont Pass.

III.11.5.2 Substations

Transmission lines carrying electricity from the DRECP area would tie into new or existing substations. In most cases, the substations would need to be upgraded to handle the additional load. This would require the installation of new equipment and structures. Depending upon the spare capacity or available space at a substation, changes could be required either within the existing fence line or outside the existing facility footprint.

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III.12 AGRICULTURAL LAND AND PRODUCTION

The Bureau of Land Management (BLM) lands do not have agricultural production as a land use, except for livestock grazing (see Chapter III.16). Therefore, this analysis applies to lands within or outside of the LUPA Decision Area where future transmission associated with renewable energy developed in the DRECP may be developed or where indirect effects from activities on BLM land may occur.

This chapter presents the regulatory setting that guides the various types of farmland within the DRECP area.

III.12.1 Regulatory Setting

III.12.1.1 Federal

III.12.1.1.1 Federal Land Policy and Management Act of 1976

The BLM regulates agricultural uses on public lands under its jurisdiction under the authority of Title III of the Federal Land Policy and Management Act (FLPMA). Agricultural leases are managed as land use authorizations under the BLM Lands and Realty Program (see Chapter III.13). Where these agricultural leases are authorized, only livestock grazing is allowed on BLM-managed public lands; other types of agriculture are prohibited.

III.12.1.1.2 Farmland Protection Policy Act

The Farmland Protection Policy Act (FPPA) of 1981 (Sections 1539-1549 [PL 97-98], Dec 22 1981) directs the Secretary of Agriculture to establish and carry out a program to:

> Minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses, and to the extent practicable, will be compatible with state, unit of local government, and private programs and policies to protect farmland (7 United States Code [U.S.C.] 4201-4209 and 7 USC 658).

The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) oversees the FPPA. FPPA categorizes farmland as Prime Farmland, Unique Farmland, and Land of Statewide or Local Importance. Farmland subject to FPPA requirements can include forestland, pastureland, cropland, or other types of land; only water or urban developed and built-up lands are excluded.

Projects are subject to FPPA requirements if they may irreversibly convert farmland, either directly or indirectly, to nonagricultural uses and are completed by or with the assistance of a federal agency. Federal permitting and licensing activities are not subject to FPPA.

III.12.1.2 State

The California Land Conservation Act of 1965 (Williamson Act)

The California Land Conservation Act of 1965, better known as the Williamson Act (California Administrative Code Section 51200 et seq.), allows private landowners to contract with counties and cities to voluntarily restrict land to agricultural and open space uses. In return, restricted parcels are assessed for property tax purposes at a rate consistent with their actual use, rather than potential market value, which in turn saves landowners 20% to 75% in property tax obligations each year. The Williamson Act is intended to preserve agricultural land and encourage open space, preservation, and efficient urban growth. Contracts issued under the Williamson Act automatically renew each year under 10-year period contracts unless the landowner files a notice of nonrenewal to terminate the contract at the end of the current 10-year period. During the 9-year nonrenewal period, property taxes are gradually raised year-by-year to their original amount.

Before 2009, counties received "subvention" (or subsidy) payments from the State to offset the property taxes lost through Williamson Act enrollment. In 2011, California passed AB 1265, which allows eligible counties to recapture 10% of the property tax benefits provided to owners of Williamson Act lands. If counties receive less than half of their foregone general fund property tax revenue from the Open Space Subvention Act program the prior year, they are eligible to implement a new provision of the Williamson Act (contained in AB 1265) that allows contracts (both Williamson Act and Farmland Security Zone) to be amended from 10 and 20 years to 9 and 18 years, respectively. Shortening the length of owners' contracts triggers a statutorily authorized recapture of 10% of their participating landowners' property tax savings. Since the increased revenue is allocated exclusively to the counties, they would recapture, on average, half of their foregone property tax revenue.

In 2009, these subvention payments were eliminated. In response to the loss of subvention funds from the state, the Imperial County Board of Supervisors decided to stop renewing Williamson Act contracts in 2012. With less than 2% of the county in private ownership, Inyo County does not participate in the Williamson Act program. The remaining counties in the DRECP area are still enrolling and renewing Williamson Act contracts.

III.12.1.2.1 Farmland Security Zones (1998)

In August 1998, the Williamson Act's Farmland Security Zone provisions were enacted with the passage of SB 1182 (Costa, Chapter 353, Statutes of 1998). This subprogram, dubbed the "Super Williamson Act," enables agricultural landowners to enter into contracts with counties in 20-year increments, with an additional 35% tax benefit over and above the standard Williamson Act contract savings. This program could potentially become an alternative to the Williamson Act; it does, however, depend on nonguaranteed state funding, which is uncertain at this time.

III.12.1.2.2 SB 618, as Amended, Wolk (February 18, 2011)

SB 618 authorizes parties to a Williamson Act contract to rescind the contract in order to enter into a solar-use easement, requiring land use for solar photovoltaic (PV) facilities for at least 10 years. To be eligible for conversion to a solar-use easement, agricultural land must be marginal and impaired (defined as nonprofitable under commercial agriculture due to lack of water, erosion, or contamination). This bill would require a county or city to include certain restrictions, conditions, or covenants in their deeds or instrument-granting documents for a solar-use easement. Under SB 618, a solar-use easement would automatically renew annually, unless either party filed a notice of nonrenewal. Either party must file a notice of nonrenewal to terminate a solar-use easement. SB 618 would also require that if the landowner terminates the solar-use easement, the landowner shall restore the property to the conditions that existed before the easement termination date. If the easement is violated, specified parties may bring an action to enforce the easement. Under SB 618, construction of solar PV facilities on land subject to a solar-use easement would qualify as an active solar energy system, which, as defined, would be excluded from a new construction tax classification.

III.12.1.2.3 California Department of Conservation, Division of Land Resource Protection's Farmland Mapping and Monitoring Program

The goal of the Farmland Mapping and Monitoring Program (FMMP) is to provide consistent and impartial data to decision makers so they can accurately assess present status, review trends, and plan for the future of California's agricultural land resources. FMMP produces Important Farmland Maps, which are a hybrid of resource quality (soils) and land use information. Agricultural lands are rated according to soil quality and irrigation status. Important Farmland Maps are updated every two years, based on aerial photograph review, computer mapping analysis, public input, and field reconnaissance. According to the Important Farmland Inventory Map, the DRECP area includes farmland classifications such as: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, Grazing Land, and Other Land. Table III.12-1 shows the acreage totals for all farmland categories, by county, within the DRECP area. Important Farmland within the larger LUPA Decision Area is shown on Figure III.12-2.

Table III.12-1
Acres of FMMP Farmland Within the DRECP Area—By County*

Category	Imperial	Inyo	Kern	Los Angeles	Riverside	San Bernardino	San Diego	Total Acres
Prime Farmland	194,000		10,000	28,000	56,000	5,000	100	293,000
Farmland of Statewide Importance	307,000		2,000	800	34,000	5,000	3,000	352,000
Unique Farmland	2,000		2,000	500	1,000	800	300	7,000
Farmland of Local Importance	36,000			6,000	39,000	30	800	82,000
Important Farmland Subtotal	*539,000*		*13,000*				*4,000*	*734,000*
Grazing Land			337,000	104,000		823,000		1,264,000
Urban and Built-Up Land	28,000		26,000	53,000	5,000	84,000	2,000	198,000
Other Land	460,000		200	486,000	18,000	210,000	76,000	1,250,000
Semi-Agricultural and Rural Commercial Land			1,000					1,000
Nonagricultural and Natural Vegetation		10	1,280,000	30		200		1,280,000
Water	800			300	1,000	400		3,000
Not Mapped	1,747,000	2,988,000	400	600	1,993,000	10,855,000	185,000	17,768,000
Vacant or Disturbed Land			71,000					71,000
Rural Residential			17,000			10		17,000
Total (All Land)	**2,775,000**	**2,988,000**	**1,746,000**	**680,000**	**2,148,000**	**11,983,000**	**268,000**	**22,587,000**

* Not including Inyo County data; except Imperial County, includes only part of counties. Source California Department of Conservation data from 2010

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Table III.12-2
Acres of FMMP Farmland Within the DRECP Area—By Ownership*

Category	Federal	Local Cities & Counties	Un-specified	Non-Profit	University of Calif	Santa Monica Conservancy	Special District	State	Tribal Lands	Total Acres
Prime Farmland	8,000	6,000	263,000	—	—	—		2,000	15,000	293,000
Farmland of Statewide Importance	4,000	4,000	344,000	—	—	—	—	900	—	352,000
Unique Farmland	500	200	6,000	—	—	—	—	10	600	7,000
Farmland of Local Importance	21,000	3,000	57,000	—	—	—		300	800	82,000
Important Farmland Subtotal	*33,000*	*13,000*	*669,000*				*10*	*3,000*	*17,000*	*734,000*
Grazing Land	283,000	2,000	969,000	—	—	200	100	11,000	200	1,264,000
Urban and Built-Up Land	10,000	2,000	186,000	—	—	—	200	70	400	198,000
Other Land	454,000	10,000	738,000	1,000		300	10	42,000	5,000	1,250,000
Semi-Agricultural and Rural Commercial Land	100		1,000	—	—	—	—	—	—	1,000
Nonagricultural and Natural Vegetation	800,000	300	453,000	40	—	—		27,000	40	1,280,000
Water	500	200	2,000	—	—	—		400		3,000
Not Mapped	15,440,000	299,000	1,305,000	27,000	2,000	—	90	586,000	111,000	17,768,000
Vacant or Disturbed Land	9,000	300	61,000	—	—	—	—	400	—	71,000
Rural Residential	200	30	17,000	—	—	—	—	—	—	17,000
Total (All Land)	**17,030,000**	**326,000**	**4,400,000**	**28,000**	**2,000**	**400**	**400**	**669,000**	**133,000**	**22,587,000**

* Not including Inyo County data; source California Department of Conservation data from 2010

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

The following describes the Important Farmland Map categories identified in Table III.12-1 and III.12-2.

- **Prime Farmland** has the most favorable combination of physical and chemical features, enabling it to sustain long-term production of agricultural crops. This land possesses the soil quality, growing season, and moisture supply needed to produce sustained high yields. To qualify for this classification, the land must have produced irrigated crops at some point during the two update cycles prior to NRCS mapping. Approximately 292,980 acres of Prime Farmland exist within the DRECP area.
- **Farmland of Statewide Importance** is similar to Prime Farmland; however, it possesses minor shortcomings such as greater slopes or less ability to store moisture. To qualify for this classification, the land must have produced irrigated crops at some point during the two update cycles prior to NRCS mapping. Approximately 351,805 acres exist within the DRECP area.
- **Unique Farmland** has lesser-quality soils for the production of the state's leading agricultural crops. Unique Farmland includes areas that do not meet the above-stated criteria for Prime Farmland or Farmland of Statewide Importance, but that have been used for the production of specific high economic-value crops during the two update cycles prior to the mapping date. It has the special combination of soil quality, location, growing season, and moisture supply needed to produce sustained high quality or high yields of a specific crop when treated and managed according to current farming methods. This land is usually irrigated, but may include nonirrigated orchards or vineyards as found in some climatic zones in California. Land must have been used for crops at some time during the 4 years prior to the mapping date. Approximately 6,773 acres exist within the DRECP area.
- **Farmland of Local Importance** is important to the local agricultural economy, as determined by the local county boards of supervisors and local advisory committees. The County of San Diego defines Farmland of Local Importance as land with the same characteristics as Prime Farmland or Farmland of Statewide Importance, with the exception of irrigation. Approximately 82,196 acres exist within the DRECP area.
- **Grazing Land** is land on which the existing vegetation is suited to livestock grazing. This category was developed in cooperation with the California Cattlemen's Association, University of California Cooperative Extension, and other groups interested in grazing activities. The minimum mapping unit for Grazing Land is 40 acres. Approximately 1,264,467 acres exist within the DRECP area.
- **Urban and Built-Up Land** consists of land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre

parcel. This land is used for residential, industrial, commercial, construction, institutional, public administration, railroad yards and other transportation facilities, cemeteries, airports, golf courses, sanitary landfills, sewage treatment facilities, water control structures, and other developed purposes. Approximately 198,367 acres exist within the DRECP area.

- **Other Land** consists of land not included in any other mapping category. Common examples include (1) low-density rural developments; (2) brush, timber, wetland, and riparian areas not suitable for livestock grazing; (3) confined livestock, poultry or aquaculture facilities; (4) strip mines and borrow pits; and (5) water bodies smaller than 40 acres. Vacant and nonagricultural land greater than 40 acres and surrounded on all sides by urban development is mapped as Other Land. Approximately 1,249,926 acres exist within the DRECP area.
- **Semi-Agricultural and Rural Commercial Land** consists of farmsteads, agricultural storage and packing sheds, unpaved parking areas, composting facilities, equine facilities, firewood lots, and campgrounds. Approximately 1,100 acres exist within the DRECP area.
- **Nonagricultural and Natural Vegetation** consists of heavily wooded, rocky or barren areas, riparian and wetland areas, grassland areas that do not qualify as grazing land due to their size or land management restrictions, small water bodies, and recreational water ski lakes. Constructed wetlands are also included in this category. Approximately 1,279,901 acres exist within the DRECP area.
- **Water** consists of perennial water bodies greater than 40 acres. Approximately 2,693 acres exist within the DRECP area.
- **Not Mapped** represents areas that have not been mapped by the FMMP; there are approximately 17,768,303 acres in the DRECP area.

III.12.1.3 Applicable Local Agricultural Lands Ordinances

III.12.1.3.1 Imperial County

The Imperial County General Plan Agricultural Element contains guidelines for the preservation of important farmland, development patterns and locations of agricultural land, prevention of conflicts between agricultural and nonagricultural uses, water availability and conservation, irrigation runoff and environmental issues, agricultural regulations, public relations and education, agricultural production and marketing research, agricultural packaging and processing operations, and special cattle, dairy, and aquaculture concerns (County of Imperial 1996).

The Imperial County Agriculture Element sets the following goals.

- **Goal 1:** All Important Farmland, as defined by federal and state agencies, should be reserved for agricultural uses.
- **Goal 3:** Limit the introduction of conflicting uses into farming areas.
- **Goal 4:** Maximize the inherent productivity of Imperial County's agricultural resources by ensuring future availability of adequate and affordable irrigation water.
- **Goal 11:** Encourage the continuation and expansion of agricultural production.

The Imperial County Agriculture Element identifies the following policies.

- **Policy 1 (Preservation of Important Farmland):** All agricultural land in Imperial County is considered Important Farmland, as defined by federal and state agencies, and should be reserved for agricultural uses. Agricultural land may be converted to nonagricultural uses only where a clear and immediate need can be demonstrated.
- **Policy 3 (Agricultural and Nonagricultural Land Use Relations):** Any new growth increases the potential for new conflicts with existing agricultural land uses. It is the policy of the County that the developer of nonagricultural land use bears the burden of preventing or mitigating agricultural or nonagricultural land use conflicts.

The Imperial County Conservation and Open Space Element sets the following goals.

- **Goal 4:** The County will actively conserve and maintain contiguous farmlands and prime soil areas to maintain economic vitality and the unique lifestyle of the Imperial Valley.
- **Goal 6:** The County shall seek to achieve maximum conservation practices and maximum development of renewable alternative sources of energy.

III.12.1.3.1.1 County of Imperial Right to Farm Ordinance No. 1031

The purpose of the County of Imperial Right to Farm Ordinance No. 1031 is to reduce the loss of its agricultural resources by clarifying the circumstances under which agricultural operations can be considered to be a nuisance. The ordinance includes a requirement for disclosure of agricultural operations as part of real estate transactions in nearby agricultural operations (County of Imperial 1996).

III.12.1.3.2 Inyo County

III.12.1.3.2.1 General Plan

Inyo County is the second-largest county (by area) in California, and 91.6% of its land is controlled by various federal agencies. Additional land is held by the State of California (3.5%), Los Angeles Department of Water and Power (2.7%), and Inyo County (or other local agencies) and Indian reservation lands (0.3%). Only about 1.9% of the county's land area is private land and therefore explicitly subject to the guidance of the Inyo County General Plan (2001).

The following General Plan Land Use Element and Conservation and Open Space Element goals and policies pertain to agricultural resources.

- **Goal GOV-4.1/Federal Land Disposition:** Protect and enhance private property interests including, but not limited to, land patents, drilling rights, mining claims, easements, rights-of-way and forage rights.
- **Goal Land Use (LU)-5:** Provide adequate public facilities and services for the existing and/or future needs of communities and their surrounding environs and conserve natural and managed resources.
- **Policy LU-5.3 Agriculture Designation (A):** Provide for agricultural uses on land that is suited by soils and water resources to the production of food and fiber on a regular and sustained basis, limited agricultural support services, agriculturally oriented services, agricultural processing facilities, public and quasi-public uses, and certain compatible nonagricultural activities. Residential uses associated with agricultural use are allowed at a maximum density of 1 dwelling unit per 40 acres. The floor area ratio for nonresidential uses shall not exceed 0.10, except for agriculturally oriented services (e.g., stables, feed stores, silos), which shall not exceed 0.25.
- **Goal Public Services and Utilities (PSU)-10:** Provide efficient and cost-effective utilities that serve the existing and future needs of people in the unincorporated areas of the County.
- **Policy PSU-10.1 Expansion of Services:** Work with local electric utility companies to design and locate appropriate expansions to electricity facilities while minimizing impacts to agriculture and noise, electromagnetic fields, visual, and other impacts on current and future residents.
- **Policy PSU-10.2 Improvements:** Promote technological improvements and the upgrading of utility services in Inyo County.
- **Goal Soil (S)-1:** Maintain the productivity of Inyo County's soils.

- **Policy S-1.1 Soil Conservation for Agriculture:** Encourage the conservation of agricultural soils to provide a base for agricultural productivity and the county's economy.
- **Goal Agriculture (AG)-1:** Provide and maintain a viable and diverse agricultural industry in Inyo County.
- **Policy AG-1.1 Identify Important Agricultural Lands:** Support and encourage the identification of important agricultural lands in the County.
- **Policy AG-1.2 Continue Agricultural Production:** Support and encourage continued agricultural production activities in the County.
- **Policy AG-1.3 Conversion of Agricultural Land:** Discourage conversions of productive agricultural lands for urban development.
- **Policy AG-1.4 Minimize Land Conflicts:** Preserve and protect agricultural lands from encroachment by incompatible land uses.
- **General Plan GOAL GOV-10 (Energy Resources) and Policy Gov-10.1 (Development)** indicate that development of energy resources on both public and private lands be encouraged with the policies of the County to develop these energy resources within the bounds of economic reason and sound environmental health.

III.12.1.3.2.2 Title 18 Zoning, Chapter 18.12 Open Space Zone

The intent of Chapter 18.12, Open Space Zone, is to establish standards for land uses that will protect and preserve environmental resources, scenic and natural features, and the open-space character of the County, while providing for appropriate agricultural development and the protection of existing agricultural areas from urban development or residential subdivision (18.12.010).

III.12.1.3.2.3 Title 21 Renewable Energy Development

Inyo County Code policies encourage renewable energy facilities. Measures mandated by code govern the siting, permitting, licensing, and construction of renewable energy facilities.

III.12.1.3.3 Kern County

III.12.1.3.3.1 General Plan

As stated in its General Plan, agriculture has been and will continue to be vital to the Kern County economy. Kern County's agricultural production has greatly increased with development of major water projects over the past two decades. Nonetheless, as in other

counties, Kern County's agricultural land is threatened by subdivision, urbanization, and the rising cost of land.

Agriculture, mineral and petroleum production, and local government are the basic industries in the county. The goals of the General Plan's Land Use, Open Space, and Conservation Element include directing new urban development to areas that will not conflict with petroleum extraction, agriculture, rangeland, or mineral resources. The following goals, policies, and implementation measures focus on agriculture and renewable energy.

- **Resource Goal 2:** Protect areas of important mineral, petroleum, and agricultural resource potential for future use.
- **Resource Goal 3:** Ensure that the development of resource areas minimally impact neighboring resource lands.
- **Resource Goal 4:** Encourage safe and orderly energy development within the County, including research and demonstration projects, and become actively involved in the decision and actions of other agencies as they affect energy development in Kern County.
- **Resource Goal 5:** Conserve prime agriculture lands from premature conversion to nonagricultural uses.
- **Resource Goal 6:** Encourage alternative sources of energy, such as solar and wind energy, while protecting the environment.
- **Resource Policy 7:** Areas designated for agricultural use, which include Class I and II and other enhanced agricultural soils with surface-water delivery systems, should be protected from incompatible residential, commercial, and industrial subdivision and development.
- **Resources Policy 9:** When evaluating General Plan amendment proposals to change an Intensive Agriculture designation, the County shall consider the level of interference with surrounding agricultural operations, the public services available, demonstrated need for a project, soil suitability for agriculture, and other contiguous nonagricultural uses.
- **Resource Policy 12:** Areas identified by the NRCS that possess high range-site value should be conserved either for Extensive Agriculture uses or as a Resource Reserve.
- **Resource Policy 15:** Agriculture and other resource uses will be considered as consistent uses in areas reserved for Mineral and Petroleum Resource use in the General Plan.

- **Resource Policy 16:** The County will encourage development of alternative energy sources by tailoring its zoning and subdivision ordinances and building standards to reflect alternative energy guidelines published by the California Energy Commission (CEC).
- **Resource Implementation Measure I:** Periodically review the County's Zoning Ordinance to reflect new technology and energy sources and encourage these types of uses for new development.

III.12.1.3.3.2 Municipal Code Chapter 19.12—Exclusive Agriculture District

Activities in the Exclusive Agriculture District are limited primarily to agriculture and other uses compatible with agriculture. Kern County considers utility and communications facilities, resource extraction, and energy development to be compatible activities within agricultural districts. Utility and communications facilities include transmission lines and supporting towers, poles, utility substations, and underground facilities for gas, water, electricity, telephone, or telegraph service. The resource extraction and energy development uses compatible with agricultural districts include permitted solar energy generators that occupy no more than one acre and small wind energy systems that meet specific criteria.

III.12.1.3.3.3 Municipal Code Chapter 19.14—Limited Agriculture District

The purpose of the Limited Agriculture District is to designate areas suitable for a combination of residential development, agricultural, and other compatible uses. Among the compatible uses are utility and communications facilities, resource extraction, and energy development uses. These uses are similar to those in the Exclusive Agriculture District, with the exception of utility substations and wind-driven electrical generators.

III.12.1.3.4 Los Angeles County

III.12.1.3.4.1 General Plan

Much of Los Angeles County has already been developed. The Los Angeles County General Plan Conservation and Natural Resources Element, Agricultural Resources section, includes policies intended to preserve the county's remaining agricultural lands. The northern portion of the county contains most of the county's agricultural land and is also experiencing the most rapid population growth. The Agricultural Resources goals and policies provide direction for both private development and government actions and programs.

Agricultural Resource Areas consist of historically farmed areas in the county, as well as farmland identified by the California Department of Conservation. These include Prime

Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance. The Agricultural Resource Area policies specifically include renewable energy facilities as incompatible with agriculture. The following policies focus on the protection of Agricultural Resource Areas.

- **Policy C/NR 8.1:** Protect Agricultural Resource Areas, and other lands identified as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance by the California Department of Conservation, from encroaching development and incompatible adjacent land uses.
- **Policy C/NR 8.2:** Discourage land uses in Agricultural Resource Areas and other lands identified as Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance by the California Department of Conservation that are incompatible with agricultural activities.
- **Policy C/NR 8.3:** Encourage agricultural activities within the Agricultural Resource Areas.

III.12.1.3.4.2 Title 22 Planning and Zoning

The agricultural zones permit a comprehensive range of agricultural use in suitable areas. Permitted uses encourage agricultural pursuits and other uses that are either required for or desired by residents. Agricultural zones include both light and heavy agricultural, including hog ranches. Permitted noncommercial wind energy conversion systems are allowed in light agricultural zones (22.24.100[B]). Electric distribution substations, electric transmission substations, generating plants, and noncommercial wind energy conversion systems require permits in heavy agricultural zones, including for hog ranches (Section 22.24.150 [A],[B]).

III.12.1.3.5 Riverside County

III.12.1.3.5.1 General Plan

The General Plan states that the county's "widespread and diverse agriculture lands" are key to the county's historic character and economic strength. Agriculture is one of the dominant industries in the county's economy, and agricultural lands provide important buffers between developed areas.

The Agriculture land use designation was established to help conserve productive agricultural lands within the county, including row crops, nurseries, citrus groves and vineyards, dairies, ranches, poultry, and hog farms. Areas designated for agriculture generally lack the needed infrastructure for urban development. The General Plan states

that "new uses encroaching upon existing agricultural operations shall provide some type of buffering to mitigate any compatibility issues" (Riverside County General Plan 2003).

The following General Plan policies are relevant to agriculture.

- **LU 16.1:** Encourage retaining agriculturally designated lands where agricultural activity can be sustained at an operational scale, where it accommodates lifestyle choice, and in locations where impacts to and from potentially incompatible uses, such as residential uses, are minimized through incentives such as tax credits.
- **LU 16.2:** Protect agricultural uses, including those with industrial characteristics (dairies, poultry, hog farms, etc.) by discouraging inappropriate land division in the immediate proximity and allowing only uses and intensities that are compatible with agricultural uses (AI 3).
- **LU 16.4:** Encourage conservation of productive agricultural lands. Preserve prime agricultural lands for high-value crop production.
- **LU 16.5:** Continue to participate in The California Land Conservation Act (the Williamson Act) of 1965.
- **LU 16.6:** Require consideration of state agricultural land classification specifications when a 2½-year Agriculture Foundation amendment to the General Plan is reviewed that would result in a shift from an agricultural to a nonagricultural use (AI 8).
- **LU 16.7:** Adhere to Riverside County's Right to Farm Ordinance.

Riverside County's Agriculture land use designation does not permit renewable energy development. The Rural Desert land use designation, however, does allow for both limited agriculture and renewable energy uses including solar, geothermal, and wind energy. It also allows the associated uses required to develop and operate renewable energy sources, but as appropriate within remote desert areas with limited access, water, and other services. This is important because, as discussed in Section 3.9 of the Riverside County General Plan (2003), the DRECP area includes a majority of Eastern Riverside County. When combined with Open Space, lands designated Agriculture, Rural, and Rural Community make up more than 98% of Eastern Riverside County.

Other Riverside County agricultural land use designations are within the Rural Community Foundation Component. These rural communities have limited infrastructure and many residents keep farm animals. Agriculture is permitted in these areas. The county recognizes the major challenges inherent in maintaining both rural character and adequate buffers between agriculture and other, incompatible uses. The Estate Density Residential, Very

Low-Density Residential, and Low-Density Residential land use designations permit agricultural activities.

III.12.1.3.5.2 Zoning

Agricultural zones include light agriculture, light agriculture with poultry, heavy agriculture, agriculture–dairy, and citrus/vineyard. The intent of the agriculture–dairy zone is to preserve dairy operations and their economic importance to the county. This zone protects dairies from urban encroachment and encourages dairies to locate in established rural and agricultural areas to minimize impacts to urbanizing communities. Permitted public utility facilities are allowed in light agriculture, light agriculture with poultry, heavy agriculture, and citrus/vineyard zones (Chapters 17.120, 17.124, 17.128, and 17.136). The agriculture–dairy zone does not allow public utility facilities (Chapter 17.132).

III.12.1.3.6 San Bernardino County

III.12.1.3.6.1 General Plan

Land Use Element

The San Bernardino County Agriculture Land Use Zoning District is intended to preserve the county's agricultural economy and protect agricultural open space. It includes commercial agricultural operations, agriculture support services, rural residential uses, and similar compatible uses. Open space and recreation uses are compatible with nonfarmed lands within this district (San Bernardino County 2007).

Conservation Element

Agriculture has historically been an important part of San Bernardino's economy. The county consistently ranks in the top 15 agricultural counties in the state. The stated purpose of the Agriculture Land Use Zoning District is to (1) recognize commercial agriculture as a desirable land use type and a major segment of the county's economic base, (2) identify areas where agriculture is the primary land use but where other secondary uses that directly support agriculture may be permitted, (3) preserve the agricultural base of the county's economy and encourage the open-space values of these uses, (4) provide areas for both intensive and extensive agricultural pursuits, and (5) identify areas of commercial (prime and nonprime) agricultural soils and operations. Areas designated for agriculture generally have limited infrastructure and are located in areas where parcel sizes and ownership patterns are large enough to accommodate agricultural operations and provide buffers from nearby incompatible land uses. The Soils/Agriculture component

of Section V—Conservation Element contains a goal (Goal CO 6) requiring that the county balance the productivity and conservation of soil resources.

The following policies, which apply to properties designated as Agriculture in the General Plan and on land use maps, support Goal CO 6 and may be relevant to the DRECP.

- **CO 6.1**: Protect prime agricultural lands from the adverse effects of urban encroachment, particularly increased erosion and sedimentation, trespass, and nonagricultural land development.
- **CO 6.2:** The County will allow the development of areas of prime agricultural lands supporting commercially valuable agriculture to urban intensity when it can be demonstrated that no long-term viability of the agricultural uses—due to encroaching urbanization—create incompatible land uses in close proximity to each other.
- **CO 6.3:** Preservation of prime and statewide important soils types, as well as areas exhibiting viable agricultural operations, will be considered an integral portion of the Open Space Element when considering development proposals.
- **CO 6.4:** Provide and maintain a viable and diverse agricultural industry in San Bernardino County.

III.12.1.3.6.2 Title 8 Development Code

The agriculture land use zoning districts provide sites for commercial agricultural operations, agriculture support services, rural residential uses, and similar and compatible uses. Open-space and recreation uses may occur on nonfarmed lands within this agriculture zoning district (Section 82.01.020). Transmission lines and control stations are allowed. Solar and wind electrical generation is allowed with a conditional use permit. The development standards are contained in Sections 84.29.030 and 84.29.040 of the Development Code for wind and solar, respectively. Wind energy support systems are allowed with specific-use permits. (Section 82.03).

III.12.1.3.7 San Diego County

The San Diego General Plan's Conservation and Open Space Element and Land Use Element each address agricultural resources. The Conservation and Open Space Element includes the following relevant goals and policies.

- **Goal COS-6: Sustainable Agricultural Industry.** Viable and long-term agricultural industry and sustainable agricultural land uses in San Diego County will serve as beneficial resources and contributors to the County's rural character and open space.

- **Goal COS-6.2: Protection of Agricultural Operations.** Protect existing agricultural operations from the encroachment of incompatible land uses. Require developers to minimize potential conflicts with adjacent agricultural operations by incorporating adequate buffers, setbacks, and project design measures to protect surrounding agriculture.

The San Diego County Land Use Element includes the following relevant goals and policies.

- **Policy LU-5.3: Rural Land Preservation**. Ensure the preservation of existing open space and rural areas (e.g., forested areas, agricultural lands, wildlife habitat and corridors, wetlands, watersheds, and groundwater recharge areas) when permitting development under the Rural and Semi Rural Land Use designations.
- **Goal LU-7: Agricultural Conservation.** Develop land use plans that retain and protect farming and agriculture as beneficial resources that contribute to the County's rural character.
- **Goal LU-10: Function of Semi-Rural and Rural Lands. Semi**-Rural and Rural Lands should buffer communities, protect natural resources, promote agriculture, and accommodate unique rural communities.

III.12.1.3.7.1 Zoning Ordinance Section 2700 – 2709

Limited Agricultural Use regulations are intended to create and preserve areas primarily used for agricultural crop production, with a limited number of small farm animals. General Agricultural Use regulations are intended to create and preserve areas for raising crops and animals. Renewable energy development is not permitted in these two agricultural zones.

III.12.2 Agricultural Land Within the DRECP Area by Ecoregion Subarea

III.12.2.1 Williamson Act Lands

Lands covered under the Williamson Act are classified as either prime or nonprime. These categories exist primarily for determining subvention payment amounts. Nonprime land, which typically consists of grazing and rangeland, is also categorized as Open Space of Statewide Significance. Williamson Act land contract terms are typically for 10 years. Some jurisdictions exercise the option to extend the terms for as long as 20 years. Contracts renew automatically every year unless a 9-year nonrenewal process is initiated. Either the local government or a landowner can initiate the nonrenewal process. During the nonrenewal process, the annual tax assessment gradually increases. At the end of the 9-year nonrenewal period, the contract is terminated (DOC2012).

Table III.12-3 shows Williamson Act lands within the DRECP area. Williamson Act lands within the larger LUPA Decision Area are shown in Figure III.12-1.

Table III.12-3
Williamson Act Lands Within the DRECP Area

Category	Acres
Mixed–Nonrenewal	500
Nonprime	52,000
Nonprime–Nonrenewal	2,000
Prime	24,000
Prime–Nonrenewal	2,000
Total	**80,000**

Source: California Department of Conservation (2004–2009), without data for Inyo, Los Angeles, or Imperial counties.
Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

As shown in Table III.12-3, the categories of Williamson Act lands within the DRECP area are as follows:

- **Mixed–Nonrenewal:** Mixed acreage parcels contain prime, nonprime, open-space easement, or other contracted or enrolled land; these parcels are not yet mapped.
- **Nonprime:** Nonprime land is enrolled under a California Land Conservation Act contract but does not meet any of the criteria for classification as prime agricultural land. Most nonprime land is in agricultural uses such as grazing or nonirrigated crops. However, nonprime land may also include other open-space uses that are compatible with agriculture and consistent with local General Plans.
- **Nonprime–Nonrenewal:** Nonprime land in the nonrenewal process.
- **Prime:** Land enrolled under California Land Conservation Act contract that meets any of the following criteria (California Government Code Section 51201).
    1. Land that qualifies as Class I or Class II in the NRCS land use capability classifications.
    2. Land that rates 80 to 100 in the Storie Index Rating. The Storie Index is a widely used method of rating soils for land use and productivity in California; higher values indicate greater suitability for agriculture.
    3. Land that supports livestock used for the production of food and fiber where there is at least one animal per acre, as defined by the U.S. Department of Agriculture.

4. Land planted with fruit or nut-bearing trees, vines, bushes or crops that have a nonbearing period of fewer than 5 years and will normally return annually during the commercial-bearing period from the production of unprocessed agricultural plant production (not less than two hundred dollars per acre).
5. Land that has been returned from the production of unprocessed agricultural plant production and has an annual gross value of not less than two hundred dollars per acre for three of the previous 5 years.

- **Prime–Nonrenewal:** Land that is enrolled under California Land Conservation Act contract and meets the criteria for Prime Land (as described above), and is in the nonrenewal process.

III.12.2.2 Important Farmland

The California Department of Conservation, Division of Land Resource Protection, implements the FMMP and determines the suitability of land for agriculture. The FMMP was developed to inventory land and define categories of important farmlands, and to provide consistent and impartial data to decision makers to assess present status, review trends, and plan for the future of California's agricultural land.

Tables III.12-1 and III.12-2 show the approximate acreage for each of the FMMP categories within the DRECP area. A large portion (14,780,550 acres) of the eastern third of the DRECP area has not been mapped.

Important Farmland acreage is found within CDCA area lands, but outside the DRECP boundary. There are 1,057,872 total acres in the BLM Decision Area outside the DRECP boundary. The majority of this acreage is not mapped (see Section III.12.2.3.11). There is a total of 342 acres of Important Farmland on BLM lands outside of the DRECP boundary. As discussed in Section III.12.1.1, while agricultural lands are within DRECP, agricultural activities other than grazing are not allowed on BLM-administered lands; therefore the 342 acres (less than 0.01% of the total) are assumed to be mapping errors.

III.12.2.3 Agricultural Land by DRECP Ecoregion Subarea

III.12.2.3.1 Cadiz Valley and Chocolate Mountains Ecoregion Subarea

The Cadiz Valley and Chocolate Mountains ecoregion subarea contains Williamson Act lands as well as FMMP Farmland (Important Farmland) identified in Table III.12-4.

The baseline includes more than 50 renewable energy projects either recently completed or under construction within the DRECP area. These projects are listed by county in Appendix O, and shown in Figure III.1-2a and Figure III.1-2b (Chapter III.1, Section

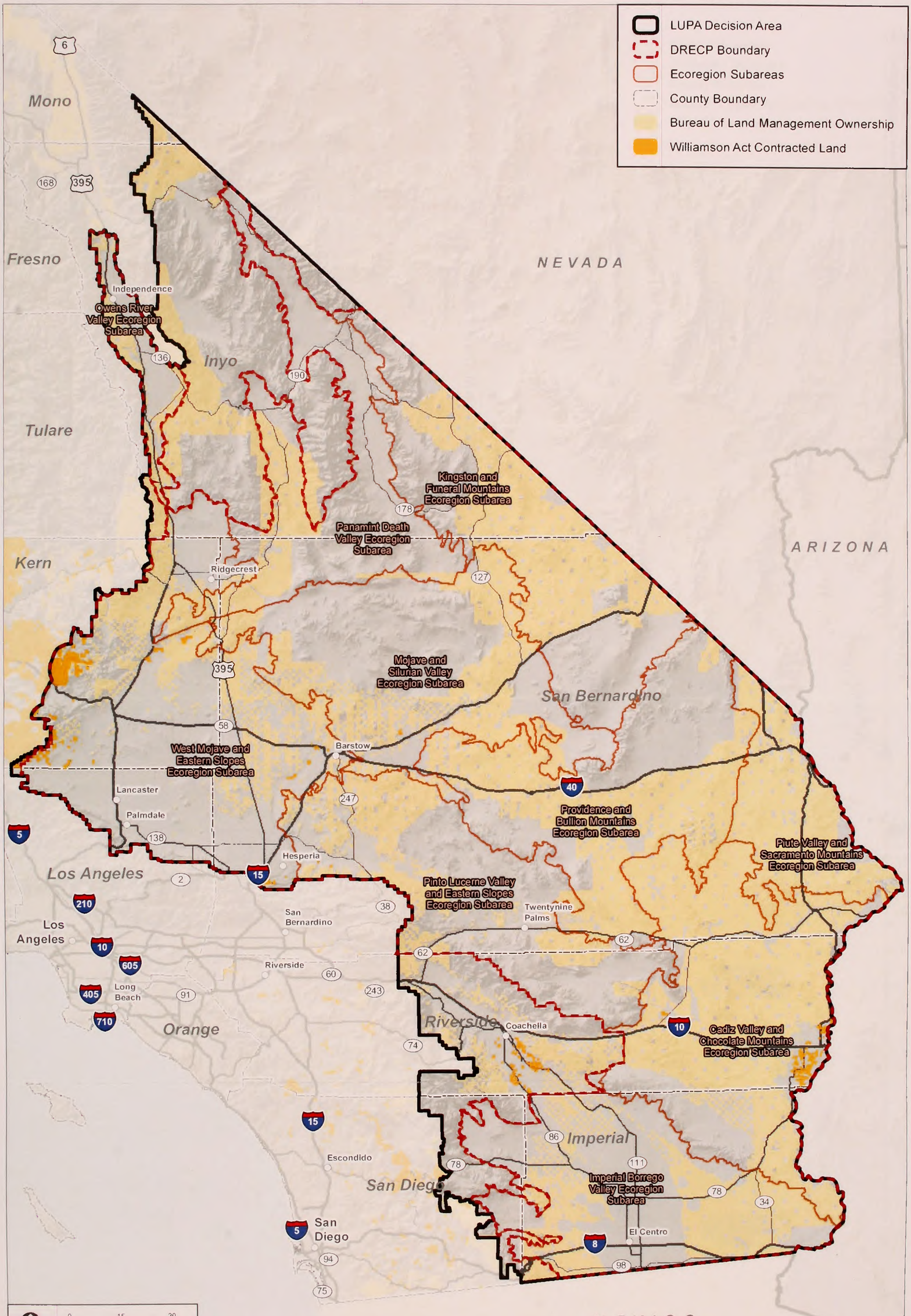
III.1.3.3). Agricultural resources were assessed in project locations. Of particular relevance to the Cadiz Valley and Chocolate Mountains baseline are the two Riverside County solar projects currently under construction on BLM-administered land: Genesis NextEra (1,950 acres), and Desert Sunlight Solar Farm (4,144 acres). As of December 2013, Genesis Phase I is operational and generating 125 MW of electricity. There is also a privately owned Solar PV project, FSE Blythe 1, on 200 acres. It is operational and generating 21 MW.

Table III.12-4
Acres of Williamson Act Lands and FMMP Farmland Within the Cadiz Valley and Chocolate Mountains Ecoregion Subarea of the DRECP Area*

Category	Acres
Prime Farmland	61,000
Farmland of Statewide Importance	36,000
Unique Farmland	2,000
Farmland of Local Importance	41,000
Other Land	22,000
Urban and Built-Up Land	5,000
Water	1,000
Not Mapped	2,884,000
Total	**3,053,000**
Williamson Act Lands	20,000

* Not including Inyo County data; source California Department of Conservation data from 2010

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.



Sources: ESRI (2014); BLM (2015); RECON (2015); California Department of Conservation (2012)

FIGURE III.12-1

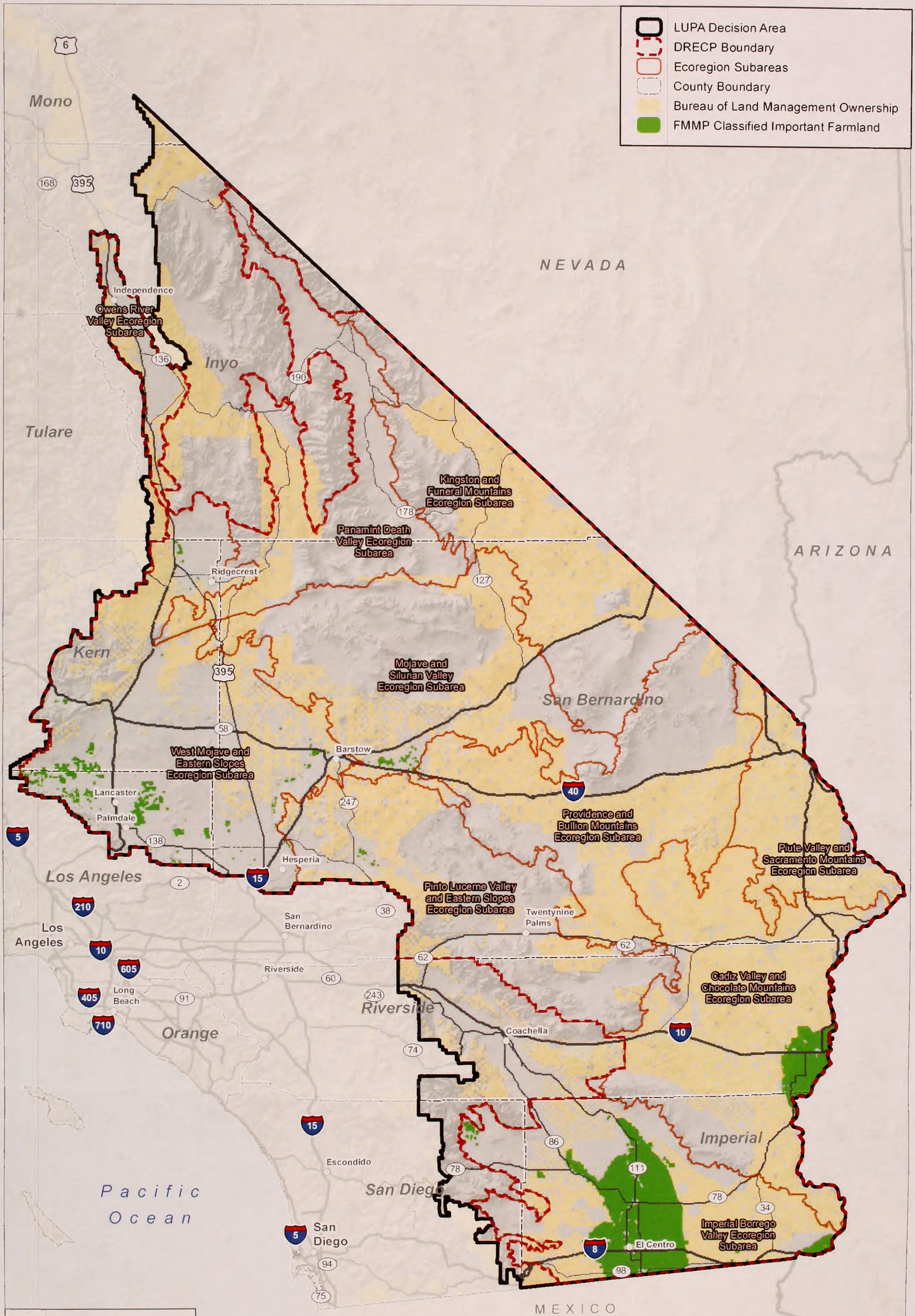
Williamson Act Lands within the LUPA Decision Area

DRECP Proposed LUPA and Final EIS

October 2015

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Sources: ESRI (2014); BLM (2015); RECON (2015); California Department of Conservation, Division of Land Resource Protection, Farmland Mapping and Monitoring Program (2010).

FIGURE III.12-2

Important Farmland within the LUPA Decision Area

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III.12.2.3.2 Imperial Borrego Valley Ecoregion Subarea

The Imperial Borrego Valley ecoregion subarea contains Williamson Act lands as well as FMMP Important Farmland, as shown in Table III.12-5. This ecoregion subarea is primarily in Imperial County, but also includes a small portion of San Diego County. Of the 53 existing renewable energy projects listed in Appendix O, 11 are within Imperial and San Diego counties and 10 are on privately owned land. Among these, Ocotillo Express Wind Project (12,436 acres) is the only project within BLM-administered land and is also the only wind technology project. Two projects are operational geothermal projects: Hudson Ranch I (305 acres; 49.9 MW) and ORNI 18 (240 acres; 50 MW). The remaining 8 projects are Solar PV, 2 of which are in San Diego County. Several of the solar photovoltaic (PV) projects under construction within Imperial County are quite large. The Centinela Solar, Campo Verde, Mount Signal and Solar Gen 2 projects are 2,067 acres, 1,990 acres, 1,409 acres, and 1,500 acres, respectively, and upon completion will together generate 659 MW. The Imperial Solar Energy Center South is partially operational and will generate up to 130 MW.

Table III.12-5
Acres of Williamson Act Lands and FMMP Farmland Within the Imperial Borrego Valley Ecoregion Subarea of the DRECP Area*

Category	Acres
Prime Farmland	189,000
Farmland of Statewide Importance	307,000
Unique Farmland	2,000
Farmland of Local Importance	35,000
Other Land	532,000
Urban and Built-Up Land	31,000
Water	700
Not Mapped	1,314,000
Total	**2,412,000**
Williamson Act Land	50

* Not including Inyo County data; source California Department of Conservation data from 2010

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

III.12.2.3.3 Kingston and Funeral Mountains Ecoregion Subarea

The Kingston and Funeral mountains ecoregion subarea contains 2,470,404 acres of unmapped FMMP lands and no Williamson Act lands.

III.12.2.3.4 Mojave and Silurian Valley Ecoregion Subarea

The Mojave and Silurian Valley ecoregion subarea contains Williamson Act lands as well as FMMP Important Farmland, as shown in Table III.12-6. Of relevance to this ecoregion subarea are the existing projects listed in Appendix O for San Bernardino County. One renewable energy project, a solar power tower project within San Bernardino County, generates 390 MW on 3,471 acres and is within BLM-administered lands. The remaining 10 existing projects within San Bernardino County are either on privately owned land or within Twentynine Palms. There are 2 operational wind projects: Cemex Black Mountain Quarry (1.5 MW) and Cemex Victorville (1.6 MW). The other 8 projects are solar (both PV and solar trough). Three are operational and 5 are under construction.

Table III.12-6
Acres of Williamson Act Lands and FMMP Farmland Within the Mojave and Silurian Valley Ecoregion Subarea of the DRECP Area*

Category	Acres
Prime Farmland	2,000
Farmland of Statewide Importance	3,000
Unique Farmland	500
Grazing Land	25,000
Nonagricultural and Natural Vegetation	21,000
Other Land	116,000
Urban and Built-Up Land	4,000
Not Mapped	2,473,000
Vacant or Disturbed Land	1,000
Rural Residential	40
Total	**2,644,000**
Williamson Act Land	700

* Not including Inyo County data; source California Department of Conservation data from 2010

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

III.12.2.3.5 Owens River Valley Ecoregion Subarea

The Owens River Valley ecoregion subarea contains 417,558 acres of unmapped FMMP lands and no Williamson Act lands.

III.12.2.3.6 Panamint Death Valley Ecoregion Subarea

The Panamint Death Valley ecoregion subarea contains some FMMP Important Farmland but no Williamson Act lands, as identified in Table III.12-7.

Table III.12-7
Acres of FMMP Farmland Within the Panamint Death Valley Ecoregion Subarea of the DRECP Area*

Category	Acres
Nonagricultural and Natural Vegetation	81,000
Not Mapped	1,856,000
Rural Residential	80
Total	**1,937,000**

* Not including Inyo County data; source California Department of Conservation data from 2010
Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

III.12.2.3.7 Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

The Pinto Lucerne Valley and Eastern Slopes ecoregion subarea contains FMMP Important Farmland and Williamson Act lands, as shown in Table III.12-8.

Table III.12-8
Acres of Williamson Act Lands and FMMP Farmland Within the Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea of the DRECP Area*

Category	Acres
Prime Farmland	400
Farmland of Statewide Importance	1,000
Unique Farmland	90
Grazing Land	361,000
Other Land	26,000
Urban and Built-Up Land	19,000
Not Mapped	1,911,000
Total	**2,319,000**
Williamson Act Land	300

* Not including Inyo County data; source California Department of Conservation data from 2010

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

III.12.2.3.8 Piute Valley and Sacramento Mountains Ecoregion Subarea

The Piute Valley and Sacramento Mountains ecoregion subarea contains 1,092,891 acres of unmapped FMMP lands and no Williamson Act lands.

III.12.2.3.9 Providence and Bullion Mountains Ecoregion Subarea

The Providence and Bullion mountains ecoregion subarea contains FMMP Important Farmland but no Williamson Act lands, as identified in Table III.12-9.

Table III.12-9
Acres of FMMP Farmland Within the Providence and Bullion Mountains Ecoregion Subarea of the DRECP Area*

Category	Acres
Farmland of Statewide Importance	70
Grazing Land	100
Other Land	17,000
Prime Farmland	40
Not Mapped	2,598,000
Total	**2,615,000**

* Not including Inyo County data; source California Department of Conservation data from 2010

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

III.12.2.3.10 West Mojave and Eastern Slopes Ecoregion Subarea

The West Mojave and Eastern Slopes ecoregion subarea contains FMMP Important Farmland and Williamson Act lands, as shown in in Table III.12-10. Of particular relevance to this ecoregion subarea are the projects within Los Angeles and Kern counties. Only one project lies within BLM-administered lands, the 2,592-acre Alta East Wind Project in Kern County. There are 9 other wind projects, totaling 44,643 acres, that are either operational or under construction on both privately owned and public land in Kern County. Seven of these wind projects were operational as of October 15, 2013, including the 13,785-acre Alta Wind project, the 8,000-acre Pine Tree Wind Farm, the 8,300-acre Pacific Wind LLC project, and the 12,781-acre North Sky River Energy project.

Also within Kern County are 8 PV projects that are either operational or under construction. Most of these are relatively small in scale with the exception of the operational 1,223-acre Catalina Renewable Energy Project.

Ten PV technology projects are operational or under construction within Los Angeles County, totaling 4,450 acres and 372.4 MW within county boundaries. The 3,200-acre AVSP 1 project, partially within both Kern and Los Angeles counties, will generate a total of 579 MW when operational.

Table III.12-10
Acres of Williamson Act Lands and FMMP Farmland Within the West Mojave and Eastern Slopes Ecoregion Subarea of the DRECP Area*

Category	Acres
Farmland of Local Importance	6,000
Farmland of Statewide Importance	4,000
Grazing Land	878,000
Prime Farmland	41,000
Unique Farmland	2,000
Nonagricultural and Natural Vegetation	1,178,000
Other Land	536,000
Semi-Agricultural and Rural Commercial Land	1,000
Urban and Built-Up Land	140,000
Water	800
Not Mapped	752,000
Vacant or Disturbed Land	70,000
Rural Residential	17,000
Total	**3,626,000**
Williamson Act Land	59,000

* Not including Inyo County data; source California Department of Conservation data from 2010a and 2010b

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

III.12.2.3.11 CDCA Lands Outside the DRECP Boundary

Table III.12-11 lists the Important Farmland outside the DRECP boundary.

Table III.12-11
Important Farmland Outside the DRECP Area

Agricultural Resource	Total Acres
Prime Farmland	10
Unique Farmland	50
Farmland of Local Importance	200
Grazing Land	80
Nonagricultural and Natural Vegetation	6,000
Other Land	103,000
Urban and Built-Up Land	100
Water	80
Not Mapped	948,000
Total	**1,058,000**

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

III.12.3 Agricultural Resources—Outside the DRECP Area

The transmission corridors outside of the DRECP area are in four geographic areas: San Diego, Los Angeles, North Palm Springs–Riverside, and the Central Valley. For agricultural resources, primary concerns are whether affected lands are under contract in the Williamson Act program, or whether the agricultural land has been identified as important under the California Department of Conservation's Farmland Mapping and Monitoring Program (FMMP), and how these lands are affected.

III.12.3.1 Williamson Act Lands

The amount of Williamson Act land in transmission corridors outside the DRECP area varies greatly, depending on the area. Williamson Act land within a 3-mile-wide swath (1.5 miles on either side of a transmission line) along each corridor ranges from 0 acres in the Los Angeles area to over 300,000 acres in the Central Valley area. Typically, transmission towers have a relatively small footprint within an agricultural field or orchard, so there is a relatively small loss of agricultural land. Transmission lines do not require cancellation of Williamson Act contracts, and agricultural practices can continue in rights-of-way (ROW) that are not occupied by towers or access roads.

III.12.3.2 Important Farmlands

As described earlier in this chapter, agricultural land is rated by soil quality and irrigation status, among other variables. As with Williamson Act lands, the amount and categories of mapped farmland and their distribution vary widely by area. Urban areas such as Los Angeles have little farmland with either unique or statewide or local importance. In contrast, the Central Valley has tens of thousands of acres of farmland in these categories. The total amount of each category of farmland affected by a project can be calculated using GIS data available through the FMMP.

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III.13 BLM LANDS AND REALTY—LAND USE AUTHORIZATIONS AND LAND TENURE

A Bureau of Land Management (BLM) land use authorization permits an applicant to use a specific piece of public land for a certain project. User-initiated proposals and applications generate the majority of requests for land use authorizations. The BLM receives inquiries and proposals from federal, state, and local governments, as well as from private individuals and companies interested in either acquiring access across or locating facilities on public land. Through Land Use Plans and Resource Management Plans (RMPs), the BLM determines (BLM Land Use Planning Handbook, H-1601-1 [Appendix C (II.E)]):

- Where use, occupancy, and development (such as major leases and land use permits) may be allowed (availability determinations).
- Existing and potential right-of-way (ROW) corridors (potential corridors include existing ROW routes with the potential for at least one additional facility, and thus can be considered a corridor if not already designated) to minimize adverse environmental impacts and the proliferation of separate ROWs (43 Code of Federal Regulations [CFR] 2806).
- Existing and potential development areas for renewable energy projects (e.g., wind and solar), communication sites, and other uses.
- ROW avoidance or exclusion areas, or areas to be avoided but which may be available for ROWs with special stipulations. The BLM also determines areas that are not available for ROWs under any circumstance.
- Terms and conditions that may apply to ROW corridors or development areas, including best management practices to minimize environmental impacts and limitations on other uses necessary to maintain the corridor and ROW values.

After BLM land use plans are complete, the decisions in that plan are implemented through such actions as specific land use authorizations. Roads, electric transmission and distribution lines, and telephone lines are the most common land use authorizations and usually require a ROW grant. Other types of facilities that require land use authorizations include water and gas pipelines, communication sites, ditches, railroads, and fiber optic lines. In recent years, many ROW grants have been issued for the development of solar and wind renewable energy projects. The BLM is currently considering numerous ROW grant applications for renewable energy projects and their associated transmission lines. Section III.13.1, Regulatory Setting, describes the laws, regulations, and policies that direct BLM as it processes these land use authorization applications.

III.13.1 Regulatory Setting

III.13.1.1 Federal

Federal Land Policy and Management Act

The Federal Land Policy and Management Act (FLPMA) establishes public land policy and guidelines for the administration, management, protection, development, and enhancement of public lands. The BLM is responsible for responding to requests to develop energy resources on BLM-administered lands in a manner that balances diverse resource use and the long-term needs of renewable and nonrenewable energy resource development. FLPMA Title V, Section 501, establishes BLM's authority to grant ROWs for electricity generation, transmission, and distribution. Title V also establishes the policies and guidelines for ROW actions, which include the authorization to issue ROWs, general provisions, terms and conditions, and existing ROWs. Title III, sections 302, 303, and 310, of FLPMA provide BLM the authority to issues permits, leases, or easements to occupy or develop public lands. In addition, to minimize adverse environmental impacts and the proliferation of separate land use authorizations, the use of common corridors shall be required to the extent practical. Each land use authorization shall reserve the right to grant additional land use authorizations for compatible uses on or adjacent to the existing authorized land use granted by the FLPMA (BLM 2001).

Energy Policy Act of 2005—Section 368 Energy Right-of-Way Corridors

Section 368 of the Energy Policy Act (PL 109-58) authorizes the secretaries of the departments of Commerce, Defense, Energy, and the Interior to (1) designate corridors for oil, gas, and hydrogen pipelines, and electricity transmission and distribution facilities on federal land in the 11 contiguous western states; (2) perform any environmental reviews that may be required to complete the designation of such corridors; and (3) incorporate the designated corridors into the relevant agency land use and resource management (or equivalent) plans.

In November 2008, the Department of Energy (DOE), BLM, U.S. Forest Service (USFS), Department of Defense (DOD), and U.S. Fish and Wildlife Service (USFWS) issued a final West-Wide Energy Corridor Programmatic Environmental Impact Statement (PEIS) that evaluated issues associated with the designation of energy corridors on federal lands in 11 western states. Based upon the information and analyses developed in that PEIS, the federal agencies could amend their respective land use plans by designating as an energy corridor one or more of the proposed energy corridors identified in the document (DOE et al. 2008). The West-Wide Energy Corridor PEIS is described in more detail later in this section.

Federal Register Volume 78, Number 83, Rules and Regulations – Segregation of Lands – Renewable Energy

The BLM amended its regulations to add provisions allowing it to temporarily segregate from the public land laws by publishing a Federal Register notice that includes public lands in a pending wind or solar energy generation ROW application. The BLM can also segregate public lands that it identifies for potential future wind or solar energy generation ROW applications. The purpose of segregation is to facilitate the processing of solar and wind energy ROW applications. Lands segregated under this rule will not be subject to appropriation under the public land laws, including location under the Mining Law of 1872, for up to 2 years from the date of publication of notice under this rule, subject to valid existing rights. Such lands, however, would remain open under the Mineral Leasing Act of 1920 and the Materials Act of 1947. This rule went into effect in May 2013 (Federal Register 2013).

Instruction Memorandum No. 2011-003 (Solar Energy Development Policy)

Instruction Memorandum No. 2011-003 was issued in October 2010 to update the Solar Energy Development Policy (Instruction Memorandum 2007-097), issued on April 4, 2007. The BLM's policy is to facilitate environmentally responsible development of solar energy projects on public lands. The BLM processes and authorizes applications for solar energy projects as ROWs under Title V of the FLPMA and Title 43, Part 2800, of the Code of Federal Regulations (CFR). This instruction memorandum provides policy guidance on early coordination with federal land managers and other stakeholders, the terms of solar energy ROW authorizations, due diligence development requirements, bond coverage, best management practices, and BLM record access. This instruction memorandum ensures effective BLM-wide consistency in the processing of ROW applications and the management of authorizations for solar energy development on public lands (BLM 2010[a]).

Instruction Memorandum No. 2011-059 (National Environmental Policy Act Compliance for Utility-Scale Renewable Energy Right-of-Way Authorizations)

Instruction Memorandum No. 2011-059 was issued in February 2011 to clarify and provide guidance regarding BLM's National Environmental Policy Act (NEPA) policy regarding utility-scale renewable energy ROW applications. This instruction memorandum specifically includes direction for the development of the Purpose and Need section, project alternatives, and impacts associated with nationally designated systems or units. Therefore, in addition to standard NEPA regulations, the environmental analysis for all utility-scale renewable energy ROW applications must abide by the guidance set forth in this instruction memorandum (BLM 2011[a]).

Instruction Memorandum No. 2011-060 (Solar and Wind Energy Applications – Due Diligence)

Instruction Memorandum No. 2011-060 was issued in February 2011 to provide updated guidance on the due diligence requirements of ROW applicants for solar and wind energy development projects on BLM-administered public lands. The BLM's policy is to facilitate environmentally responsible development of solar and wind energy on public lands, consistent with the provisions of Secretarial Order 3285A1 dated March 11, 2009, as amended on February 22, 2010. However, BLM seeks to avoid ROW applications from land speculators, which could hinder other applicants with serious interests in the potential development of solar or wind energy resources. This concern is mitigated through the application of qualification requirements (43 CFR 2804.12[a][5]) and 43 CFR 2804.26[a][5]). These require the timely submittal of a Plan of Development (43 CFR 2804.25), and a project applicant is informed at the time of application that ROW applications are not assignable interests (43 CFR 2807.21) (BLM 2011[b]).

Instruction Memorandum No. 2011-061 (Solar and Wind Energy Applications – Pre-Application and Screening)

Instruction Memorandum No. 2011-061 was issued in February 2011 to provide updated guidance on the review of ROW applications for solar and wind energy development projects on BLM-administered public lands. The BLM's policy is to facilitate environmentally responsible development of solar and wind energy projects in accordance with the provisions of Secretarial Order 3285A1, dated March 11, 2009, as amended on February 22, 2010. This development must also be consistent with protection of areas and resources of national interest, including the BLM National Landscape Conservation System, units of the National Park System and National Forest System, national wildlife refuges, and other specially designated areas that protect wildlife and visual, cultural, historic, or paleontological resources. Early coordination and careful prior review of proposed renewable energy projects with federal, state, tribal, and local government agencies will enable BLM to identify and prioritize ROW applications with the fewest resource conflicts and the greatest likelihood of success in the permitting process. To achieve these goals, BLM will require all prospective applicants to schedule and participate in at least two pre-application meetings before filing an application for solar or wind energy development (BLM 2011[c]).

Instruction Memorandum No. 2011-181 (Involvement of Grazing Permittee/Lessee With Solar and Wind Energy Right-of-Way Application Process)

Instruction Memorandum No. 2011-181 was issued in September 2011 to clarify the date when BLM Field Offices are required to notify a grazing permittee/lessee that a solar or

wind energy development application may affect a livestock grazing operation. Regulation (43 CFR 2005 4110.4-2[b]) requires that, when public lands are disposed of or devoted to a public purpose that precludes livestock grazing, the permittee/lessee shall be given 2 years' notice (except in cases of emergency) before the grazing permit/lease and grazing preference can be canceled. This instruction memorandum also addresses potential mitigation and compensation strategies and the relationship of energy application steps/ decisions with grazing administrative steps/decisions (BLM 2011[d]).

Instruction Memorandum No. 2010-156 (Bald and Golden Eagle Protection Act – Golden Eagle National Environmental Policy Act and Avian Protection Plan Guidance for Renewable Energy)

Instruction Memorandum No. 2010-156 was issued in December 2008 to provide direction for compliance with the Bald and Golden Eagle Protection Act, including its implementing regulations (e.g., September 11, 2009, Eagle Rule 50 CFR parts 13 and 22) for golden eagles. This memorandum also identifies the necessary steps that ensure environmentally responsible authorization and development of renewable energy resources within their habitat. This instruction memorandum primarily addresses golden eagles since a process to acquire take permits for bald eagles already exists. This instruction memorandum is applicable until the USFWS establishes criteria for programmatic golden eagle permits (BLM 2010[b]).

Instruction Memorandum No. 2009-020 (Interim Policy on Management of Donated Lands and Lands Acquired With Land and Water Conservation Funds)

Instruction Memorandum No. 2009-020 was issued in December 2008 to ensure that lands acquired by BLM under donation agreements, for mitigation/compensation purposes, or with Land and Water Conservation Funds will be managed as avoidance/exclusion areas for land use authorizations that could result in surface disturbances. In addition, this memorandum was established to ensure statewide consistency for BLM managers considering land use authorization applications and pre-applications in California (BLM 2009[a]).

Instruction Memorandum No. 2009-043 (Wind Energy Development Policy)

Instruction Memorandum No. 2009-043 was issued in December 2008 to provide updated guidance on processing ROW applications for wind energy projects on BLM-administered public lands. This instruction memorandum further clarifies BLM wind energy development policies and best management practices in the Wind Energy Development PEIS of June 2005. Issuance of this instruction memorandum ensures BLM-wide consistency in the processing of ROW applications and the management of authorizations for wind energy

site testing and development. The initiation of any new planning effort to create, revise, or amend a BLM land use plan will comply with policy provided in this instruction memorandum. Land use planning efforts already underway will be assessed on a case-by-case basis to determine any necessary modifications or amendments (BLM 2009[b]).

Solar Energy Development PEIS

The Final PEIS for Solar Energy Development in Six Southwestern States was prepared by BLM and DOE to assess the environmental impacts of developing and implementing agency-specific programs that encourage environmentally responsible utility-scale solar energy development in Arizona, California, Colorado, New Mexico, Nevada, and Utah. The BLM's selected alternative is the solar energy development program alternative, which identifies specific locations that are well suited for utility-scale production of solar energy, commonly referred to as Solar Energy Zones (SEZs). BLM defines a SEZ as an area with few impediments to utility-scale solar production where BLM prioritizes solar energy and its associated transmission infrastructure. The program alternative also allows for responsible utility-scale solar development in variance areas outside of SEZs, in accordance with the proposed variance process. (BLM and DOE 2010)

In October 2012, BLM released the Approved Resource Management Plan Amendments/ Record of Decision (ROD), which includes the decision to implement a comprehensive solar energy program and administer development of utility-scale solar energy resources on BLM-administered public lands. The decision incorporates land use allocations and programmatic and SEZ-specific design features into 89 BLM land use plans in the six-state study area (BLM 2012[a]).

The ROD includes two SEZs in California, both of which are within the boundaries of the Desert Renewable Energy Conservation Plan (DRECP) area. The Imperial East SEZ consists of 5,717 acres in southeastern Imperial County near the U.S. border with Mexico. The Riverside East SEZ consists of 147,910 acres in southeastern Riverside County. In August 2013 the West Chocolate Mountains Renewable Energy Evaluation Area ROD created a third SEZ, the West Chocolate Mountains in Imperial County. The West Chocolate Mountains SEZ includes 10,759 acres of BLM land (BLM 2012[a]).

The BLM's Solar Energy Plan (also known as the Western Solar Plan) was approved through the ROD, which amended the California Desert Conservation Area (CDCA) Plan and the Bishop and Caliente Resource Management Plans. This program allows permitting for future solar energy development projects to proceed in a more efficient, standardized, and environmentally responsible manner (BLM 2013[a]).

West-Wide Energy Corridor PEIS

The secretaries of the departments of Agriculture, Commerce, Defense, Energy, and the Interior prepared the West-Wide Energy Corridor PEIS to comply with Section 368 of the Energy Policy Act of 2005. The West-Wide Energy Corridor PEIS analyzed two alternatives in detail. Under the No Action Alternative, no Section 368 energy corridors would be designated on federal lands. Under the Proposed Action Alternative, designation of Section 368 energy corridors on federal land would include slightly more than 6,000 miles in the 11 western states (BLM 2008).

In January 2009, BLM released the Approved Resource Management Plan Amendments/ Record of Decision, which designated corridors on BLM lands by amending 92 land use plans, including the CDCA Plan and the Bishop Resource Management Plan (BLM 2009[c]).

In July 2012 the BLM, U.S. Forest Service (USFS), and DOE entered into a settlement agreement with various nongovernmental organizations to resolve a lawsuit brought by the nongovernmental organizations after the agencies approved the Section 368 corridors. One of the requirements of the agreement was that BLM and USFS make future recommendations for revisions, deletions, and additions to the Section 368 corridor network consistent with applicable law, regulations, and agency policy and guidance and that they would consider the following general principles in future siting recommendations:

- Corridors are thoughtfully sited to provide maximum utility and minimum impact to the environment.
- Corridors promote efficient use of the landscape for necessary development.
- Appropriate and acceptable uses are defined for specific corridors.
- Corridors provide connectivity to renewable energy generation to the maximum extent possible while also considering other sources of generation to balance the renewable sources and to ensure the safety and reliability of electricity transmission.

III.13.2 Affected Environment

This section provides a setting for existing and pending land use authorizations within the LUPA Decision Area, which includes both wind and solar renewable energy projects and utility corridors for transmission lines. Geothermal leasing is discussed in Chapter III.15, Mineral Resources. This section also describes the lands that either could be excluded or avoided areas for land use authorizations.

III.13.2.1 Rights-of-Way for Wind and Solar Energy Development

Table III.13-1 lists authorized wind and solar project site data for developments within the LUPA Decision Area (BLM 2013b). According to this data, there are 310,000 acres of authorized renewable energy development and testing ROWs. The majority of this development is in Kern County (156,000 acres) and consists of both wind energy development and wind testing sites. Wind energy development is also dominant in San Bernardino and Imperial counties. Solar energy developments are more prominent in Riverside County.

Table III.13-1
BLM Authorized Renewable Energy Rights-of-Way Within the LUPA Decision Area (by County)

Project Name	CACA Number	Project Type	BLM Acres
Imperial County			
Ocotillo Express LLC – Ocotillo Renewables	48004	Wind testing	3,000
John Deere Renewables – Milpitas	51062	Wind testing	6,000
Pattern Energy Group – Ocotillo Express	51552	Wind development	12,000
L.H. Renewables – Gold Basin	51947	Wind testing	8,000
Centinela Solar Energy Project	52092	Photovoltaic – private project with BLM transmission	20
Imperial Solar Energy Project	51642	Photovoltaic – private project with BLM transmission	20
Imperial Solar Energy Center West	51644	Photovoltaic – private project with BLM transmission	60
Campo Verde Solar Project	53151	Photovoltaic – private project with BLM transmission	20
Total BLM Authorized Renewable Energy Acres in Imperial County			*68,000*
Inyo County			
Little Lake South Renewables	49581	Wind testing	4,000
Kern County			
Cameron Ridge LLC	9501	Wind turbines	500
Oak Creek Energy – Tehachapi	13528	Wind turbines	200
Cameron Ridge LLC	13768	Wind turbines	200
Pacific Crest Power LLC	40435	Wind turbines	20
Boulevard Associates – North Sky River	47847	Wind testing	10,000
Oak Creek/Sun Creek	44611	Wind testing	2,000

Table III.13-1
BLM Authorized Renewable Energy Rights-of-Way Within the LUPA Decision Area (by County)

Project Name	CACA Number	Project Type	BLM Acres
Tylerhorse Canyon	45553	Wind testing	2,000
Bent Tree Wind	46978	Wind testing	500
Southwest	47848	Wind testing	7,000
Soledad Mountain Wind	48536	Wind testing	1,000
Renewergy LLC – El Paso Peaks	48948	Wind testing	8,000
Competitive Power Ventures – Saltdale	49547	Wind testing	44,000
Barren Ridge	51016	Wind testing	11,000
Golden Square	51335	Wind testing	600
Freeman Junction	51386	Wind testing	26,000
Pacific Wind Red Mountain	52848	Wind testing	25,000
Wind Energy Inc. – El Paso Mountain	52477	Wind testing	18,000
Alta Windpower Development LLC – Alta East	52537	Wind development	2,000
Total BLM Authorized Renewable Energy Acres in Kern County			*156,000*
Riverside County			
Desert Sunlight	48649	Solar photovoltaic	4,000
Palo Verde Solar I LLC – Blythe	48811	Solar parabolic trough	7,000
NextEra-McCoy	48728	Solar photovoltaic	4,000
Genesis Solar	48880	Solar parabolic trough	2,000
EDF Renewable Energy – Desert Harvest	49491	Solar photovoltaic	1,000
Rice Solar Energy	51022	Solar power tower – private project with BLM transmission	200
Total BLM Authorized Renewable Energy Acres in Riverside County			*19,000*
San Bernardino County			
Solar Partners I – Ivanpah 2	48668	Solar power tower	3,000
Stateline Solar Farm	48669	Solar photovoltaic	2,000
North Peak Wind Testing	49255	Wind testing	15,000
Del Sur Wind Energy LLC – Juniper Flats	51767	Wind testing	3,000
Lucerne II	51772	Wind testing	22,000
Abengoa Mojave Solar Project	52096	Solar parabolic trough – private project with BLM transmission	200
Silver Mountain Wind Energy Project	53214	Wind testing	17,000

Table III.13-1
BLM Authorized Renewable Energy Rights-of-Way Within the LUPA Decision Area (by County)

Project Name	CACA Number	Project Type	BLM Acres
Pacific Wind Development – Silurian Valley Wind	54021	Wind testing	Not provided
Total BLM Authorized Renewable Energy Acres in San Bernardino County			*63,000*
Total BLM Authorized Renewable Energy Acres Within the LUPA Decision Area			**310,000**

Source: BLM 2013b
Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.
Updated information on applications and authorizations is available on the BLM website at: http://www.blm.gov/pgdata/content/ca/en/prog/energy/pendingapps.html.

III.13.2.2 Land Use Authorizations – Corridors

Over 1,320,000 acres of BLM-designated utility corridors are within the boundaries of the LUPA Decision Area.

As discussed in Section III.13.1.1, Section 368 corridors have been designated by the West-Wide Energy Corridor PEIS. Section 368 energy corridors are within existing utility and/or transportation land use authorizations. There are 236,000 acres of Section 368 corridors within the boundaries of the LUPA Decision Area.

III.13.2.3 Land Use Authorizations – Exclusion Areas

The following land use plan designations or uses may exclude land use authorizations: Areas of Critical Environmental Concern, Desert Wildlife Management Areas, National Landscape Conservation System lands, wilderness and wilderness study areas, grazing allotments, mineral lease areas, withdrawal areas, and recreation lands. Thousands of acres of lands in the LUPA Decision Area are withdrawn under secretary/executive orders, acts of Congress, and Public Land Orders. These can be for a wide variety of uses including military, jurisdictional transfers to other agencies, and resource protection. Locations of these withdrawals are typically identified on Master Title plats and evaluated for compatibility with proposed land use authorizations (including renewable energy ROWs) on a case-by-case basis.

Exclusion areas vary by land use plan. Adjustments to exclusion areas will be made through land use planning and/or implementation action review. Additional exclusion areas could include lands cooperatively managed with partner agencies. The BLM determines if an area

is excluded by one of these uses or designations on a case-by-case basis when an application is received.

III.13.2.4 Land Use Authorizations for Nonrenewable Energy Uses

A wide variety of land use authorizations exist in the LUPA Decision Area that do not relate to renewable energy or transmission lines. These major land use authorizations include roads and highways, telephone lines, leases for recreation and public purposes, oil and gas facilities, water and gas pipelines, water facilities, communication sites, ditches, railroads, and fiber optic lines. Other than these major land uses, land use authorizations include miscellaneous permits and leases such as temporary use permits, special use permits, and mineral leases. A land use authorization allows rights and privileges for these uses for a specific period. These operations are considered valid existing rights and will continue to operate under the terms of their current authorizations.

III.13.3 Land Tenure

The BLM provides for land use, purchase, exchange, donation, and sale; determines the boundaries of federal land; and maintains historic records for these ownership transactions. Land ownership transfers through purchase, exchange, donation, and sale are an important component of BLM's land management strategy. The BLM completes ownership transactions involving land and interests in land when such transactions are in the public interest and consistent with publicly approved land use plans. The BLM's Land Tenure program is designed to:

- Improve management of natural resources through consolidation of federal, tribal, state, and private lands.
- Increase recreational opportunities and secure public access to public lands.
- Preserve open space and traditional landscapes.
- Secure key property necessary to protect endangered species, promote biological diversity, and preserve wildlife habitat and migration corridors.
- Preserve archaeological, historical, and paleontological resources.
- Implement specific acquisitions authorized by acts of Congress.
- Allow for expansion of communities and consolidation of nonfederal land ownership.

Each of the applicable BLM land use plans includes discussions regarding land tenure. As stated in the CDCA Plan's Land Tenure Adjustment Element, intermingled land ownership patterns make management difficult for BLM and other agencies. Therefore, selected land exchanges and boundary adjustments are required to improve opportunities to use or

protect lands. In particular, this element is designed to direct the acquisition and disposal of public lands to maximize the efficiency and consistency of public land management.

The CDCA Plan further establishes a classification system that places BLM-administered public lands within CDCA boundaries into one of four multiple-use classes (C, L, M, and I), based on the sensitivity of the resource and types of uses for each geographic area. Under the CDCA's Multiple-Use Class Guidelines, land disposals are not allowed on lands within Multiple-use Classes C, L, or I; however, land disposals are allowed within Class M and within unclassified lands, subject to FLPMA and other applicable federal laws and regulations. Lands in Classes C, L, and I can only be sold after first changing their classification through the plan amendment process.

Within the LUPA Decision Area, under applicable land management plans (including the Bishop and Bakersfield RMPs) and CDCA amendments (including the West Mojave, Northern and Eastern Mojave, Northern and Eastern Colorado plan amendments), there are goals and objectives for the disposal and acquisition of specific lands within each plan's boundaries. For instance, the Bakersfield RMP identifies some parcels for potential acquisition and disposal to advance the goals and objectives of the RMP, including providing for community expansion (BLM 2012[b]).

III.13.4 Bureau of Land Management Renewable Energy Land Use Authorizations by Ecoregion Subarea

III.13.4.1 Cadiz Valley and Chocolate Mountains Ecoregion Subarea

III.13.4.1.1 Right-of-Way Grants for Wind and Solar Energy Development

The majority of the Cadiz Valley and Chocolate Mountains ecoregion subarea is within eastern Riverside County. The northern portion of this ecoregion subarea is within San Bernardino County, and the southern portion is within eastern Imperial County.

Of the BLM-authorized renewable energy ROWs presented in Table III.13-1, the following are entirely within this ecoregion subarea:

- John Deere Renewables – Milpitas
- Genesis Solar LLC – Genesis Solar
- NextEra-McCoy
- Desert Sunlight Holdings LLC – Desert Sunlight
- Palo Verde Solar I LLC – Blythe
- EDF Renewable Energy – Desert Harvest Solar

III.13.4.1.2 Land Use Authorizations for Utility Corridors

There are 270,000 acres of BLM-designated utility corridors within the boundaries of this ecoregion subarea, and 22,000 acres of Section 368 corridors within its boundaries.

III.13.4.2 Imperial Borrego Valley Ecoregion Subarea

III.13.4.2.1 Right-of-Way Grants for Wind and Solar Energy Development

The majority of the Imperial Borrego Valley ecoregion subarea is within Imperial County, and a small portion of the western boundary of this ecoregion subarea is within San Diego County.

Of the BLM-authorized renewable energy ROWs presented in Table III.13-1, the L.H. Renewables LLC – Gold Basin, Ocotillo Express LLC – Ocotillo Renewables, and Pattern Energy Group – Ocotillo Express are entirely within this ecoregion subarea.

III.13.4.2.2 Land Use Authorizations for Utility Corridors

There are 92,861 acres of BLM-designated utility corridors within the boundaries of the ecoregion subarea and 22,968 acres of Section 368 corridors within its boundaries.

III.13.4.3 Kingston and Funeral Mountains Ecoregion Subarea

III.13.4.3.1 Right-of-Way Grants for Wind and Solar Energy Development

The northern portion of the Kingston and Funeral Mountains ecoregion subarea is within Inyo County, and the southern portion of this ecoregion subarea is within San Bernardino County. Of the BLM-authorized renewable energy ROWs presented in Table III.13-1, the Solar Partners I – Ivanpah 2 and Stateline Solar Farm facilities are entirely within this ecoregion subarea.

III.13.4.3.2 Land Use Authorizations for Utility Corridors

There are 119,000 acres of BLM-designated utility corridors within the boundaries of the ecoregion subarea and 19,000 acres of Section 368 corridors within its boundaries.

III.13.4.4 Mojave and Silurian Valley Ecoregion Subarea

III.13.4.4.1 Right-of-Way Grants for Wind and Solar Energy Development

The Mojave and Silurian Valley ecoregion subarea is almost entirely within San Bernardino County, except for a small portion of the western boundary that is within Kern County. Of the BLM-authorized renewable energy ROWs presented in Table III.13-1, the Pacific Wind Development – Silurian Valley Wind is entirely within this ecoregion subarea.

III.13.4.4.2 Land Use Authorizations for Utility Corridors

There are over 191,000 acres of BLM-designated utility corridors within the boundaries of the ecoregion subarea and over 29,000 acres of Section 368 corridors within the boundaries of the ecoregion subarea.

III.13.4.5 Owens River Valley Ecoregion Subarea

III.13.4.5.1 Right-of-Way Grants for Wind and Solar Energy Development

The Owens River Valley ecoregion subarea is entirely within the western side of Inyo County. Of the verified BLM renewable energy ROWs presented in Table III.13-1, the Little Lake South Renewables LLC – Little Lake N facility is entirely within the ecoregion subarea.

III.13.4.5.2 Land Use Authorizations for Utility Corridors

There are over 27,000 acres of BLM-designated utility corridors within the boundaries of the ecoregion subarea, and almost 22,000 acres of Section 368 corridors within its boundaries.

III.13.4.6 Panamint Death Valley Ecoregion Subarea

III.13.4.6.1 Right-of-Way Grants for Wind and Solar Energy Development

The northern portion of the Panamint Death Valley ecoregion subarea is within Inyo County; and the southern portion is within San Bernardino County, with a small portion of the southwestern boundary within Kern County.

Of the BLM-authorized renewable energy ROWs in Table III.13-1, the Renewergy LLC – El Paso Peaks facility is entirely within this ecoregion subarea. The Wind Energy Inc. – El Paso Mountain facility is partially within both this ecoregion subarea and the West Mojave and Eastern Slopes ecoregion subarea.

III.13.4.6.2 Land Use Authorizations for Utility Corridors

There are over 13,000 acres of BLM-designated utility corridors within the boundaries of the ecoregion subarea and almost 1,300 acres of Section 368 corridors within its boundaries.

III.13.4.7 Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

III.13.4.7.1 Right-of-Way Grants for Wind and Solar Energy Development

The majority of the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea is within San Bernardino County, and a portion of the south end is within Riverside County.

Of the verified BLM renewable energy ROWs shown in Table III.13-1, the following are entirely within this ecoregion subarea:

- North Peak Wind Testing
- Del Sur Wind Energy LLC – Juniper Flats

Of the BLM-authorized renewable energy ROWs presented in Table III.13-1, the Del Sur Wind Energy LLC – Lucerne II facility is partially within this ecoregion subarea, as well as the West Mojave and Eastern Slopes ecoregion subarea. The Silver Mountain Wind Energy Project LLC facility is partially within this ecoregion subarea, as well as the West Mojave and Eastern Slopes ecoregion subarea.

III.13.4.7.2 Land Use Authorizations for Utility Corridors

There are over 113,000 acres of BLM-designated utility corridors within the boundaries of the ecoregion subarea and approximately 11,000 acres of Section 368 corridors within its boundaries.

III.13.4.8 Piute Valley and Sacramento Mountains Ecoregion Subarea

III.13.4.8.1 Right-of-Way Grants for Wind and Solar Energy Development

The Piute Valley and Sacramento Mountains ecoregion subarea is entirely within the southeastern area of San Bernardino County. There are no authorized renewable energy ROWs in this ecoregion subarea.

III.13.4.8.2 Land Use Authorizations for Utility Corridors

There are over 111,000 acres of BLM-designated utility corridors within the boundaries of the ecoregion subarea and approximately 14,000 acres of Section 368 corridors within its boundaries.

III.13.4.9 Providence and Bullion Mountains Ecoregion Subarea

III.13.4.9.1 Right-of-Way Grants for Wind and Solar Energy Development

The Providence and Bullion Mountains ecoregion subarea is entirely within San Bernardino County. None of the authorized BLM renewable energy ROWs presented in Table III.13-1 are within this ecoregion subarea.

III.13.4.9.2 Land Use Authorizations for Utility Corridors

There are almost 230,000 acres of BLM-designated utility corridors within the boundaries of the ecoregion subarea and approximately 46,000 acres of Section 368 corridors within its boundaries.

III.13.4.10 West Mojave and Eastern Slopes Ecoregion Subarea

III.13.4.10.1 Right-of-Way Grants for Wind and Solar Energy Development

The West Mojave and Eastern Slopes ecoregion subarea is within Kern, Los Angeles, and San Bernardino counties, with a small portion within Inyo County.

Of the verified BLM renewable energy ROWs presented in Table III.13-1, the following are entirely within this ecoregion subarea:

- Alta Windpower Development LLC – Alta East
- Competitive Power Ventures LLC – Saltdale
- Rising Tree Wind Farm LLC
- Sierra Renewables, Pearsonville
- Alta Windpower Dev. LLC – Oak Creek/Sun Creek
- Oak Creek Energy – Southwest
- Oak Creek Energy – Tehachapi
- Renewergy LLC – El Paso Peaks
- Oak Creek Energy – Soledad Mountain
- Boulevard Associates – North Sky River
- Pacific Crest Power LLC
- Cameron Ridge LLC
- Tylerhorse Canyon
- Barren Ridge
- L.H. Renewables – Freeman Junction
- Alta Wind 1 – Golden Square
- Wind Energy Inc. – El Paso Mountain
- Pacific Wind Red Mountain
- Bent Tree Wind
- Silver Mountain Wind Energy Project LLC

In addition, the Silver Mountain Wind Energy Project LLC facility is partially within this ecoregion subarea, as well as the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea.

III.13.4.10.2 Land Use Authorizations for Utility Corridors

There are almost 154,000 acres of BLM-designated utility corridors within the boundaries of the ecoregion subarea and over 50,000 acres of Section 368 corridors within its boundaries.

III.13.5 Bureau of Land Management Lands and Realty – Outside the LUPA Decision Area

The transmission corridors outside of the LUPA Decision Area include four geographic areas: San Diego, Los Angeles, North Palm Springs–Riverside, and the Central Valley.

III.13.5.1 Right-of-Way Grants for Wind and Solar Energy Development

As stated in Section III.13.2, the renewable energy ROW grants include sites for both wind and solar development and utility corridors. Based on data provided by BLM, Table III.13-1 shows the authorized wind and solar project sites within the LUPA Decision Area (BLM 2013[b]).

There are BLM-authorized renewable energy ROWs near the boundaries of the DRECP. No BLM ROWs are located near transmission corridors in the Central Valley area. The locations of authorized ROWs within the San Diego, Los Angeles, and North Palm Springs–Riverside areas are described in the following sections.

III.13.5.1.1 San Diego Area

Five ROW sites designated for wind energy development are in the vicinity of transmission corridors in the San Diego area. Two sites would be traversed by the transmission line corridor, and one site would be approximately 3.5 miles south of a transmission line corridor. Two other sites are in the center of San Diego County, approximately 13 to 17 miles north of the closest transmission line corridor.

III.13.5.1.2 Los Angeles Area

One BLM ROW site designated for wind energy development would be traversed by the transmission line corridor under one alternative in the Los Angeles area. This ROW site is west of Vincent Substation, approximately 4 miles west of the DRECP boundary. Three major transmission lines are in the immediate vicinity.

III.13.5.1.3 North Palm Springs–Riverside Area

Ten ROW sites are within the North Palm Springs–Riverside area. Two ROW sites would be traversed by transmission corridors, and the other eight sites would be within 2 miles of transmission line corridors. Of these sites, nine are designated for wind energy development and one site is designated for solar energy development. This cluster of ROW sites is in the north central part of Riverside County along the western edge of the DRECP boundary; the distance from the DRECP varies from 5 to 11 miles west of the boundary.

III.13.5.2 Land Use Authorizations for Utility Corridors

The land use authorizations consist of BLM utility corridors and Section 368 corridors extending outside of the DRECP boundary, as described in the following sections.

III.13.5.2.1 BLM Utility Corridors

In the North Palm Springs–Riverside area, a utility corridor extends approximately 70 miles west from the western boundary of the Cadiz Valley and Chocolate Mountains ecoregion subarea. At the northern border of Riverside County, a small portion of a utility corridor extends approximately 2 miles south of the southern boundary of the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea. At the southern border of Riverside County, a small portion of a utility corridor extends approximately 10 miles northwest from a corridor in the Imperial Borrego Valley ecoregion subarea. These BLM utility corridors would all align with proposed transmission line corridors.

III.13.5.2.2 Section 368 Corridors

San Diego Area

A Section 368 corridor extends approximately 9 miles from the southwestern boundary of the Imperial Borrego Valley ecoregion subarea through both Imperial and San Diego counties. A corridor is also located to the west along Highway 8 and is approximately 30 miles long. These Section 368 corridors would align with proposed transmission line corridors.

Los Angeles Area

Two Section 368 corridors extend from the southern boundary of the West Mojave and Eastern Slopes ecoregion subarea:

- An approximately 15-mile corridor extends in a southwest direction from the southwest boundary of this ecoregion subarea near the Antelope Substation. This section 368 corridor would not align with any of the proposed transmission corridor alternatives.

- An approximately 20-mile corridor extends in a southwest direction from the southern boundary of this ecoregion subarea near the Vincent Substation. This section 368 corridor would follow a transmission line corridor.

North Palm Springs–Riverside Area

In San Bernardino County, an approximately 13-mile Section 368 corridor extends in a southeast direction from the southeastern boundary of the West Mojave and Eastern Slopes ecoregion subarea near the Lugo Substation. This section 368 corridor would generally align with proposed transmission line corridors.

In Riverside County, a Section 368 corridor extends approximately 57 miles west from the western boundary of the Cadiz Valley and Chocolate Mountains ecoregion subarea. This section 368 corridor would align with proposed transmission line corridors.

III.13.5.3 Land Use Authorizations for Exclusion Areas

The following land use plan designations may be excluded: ACECs, Desert Wildlife Management areas, NLCS units, wilderness and wilderness study areas, grazing allotments, mineral lease areas, withdrawal areas, and recreation lands. The BLM determines if an area is excluded by one of these uses or designations on a case-by-case basis when an application is received.

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III.14 BLM LAND DESIGNATIONS, CLASSIFICATIONS, ALLOCATIONS, AND LANDS WITH WILDERNESS CHARACTERISTICS

This chapter presents the environmental setting and affected environment for the Desert Renewable Energy Conservation Plan (DRECP) Bureau of Land Management (BLM) Land Use Plan Amendment (LUPA) land designations, classifications, allocations, and inventoried lands with wilderness characteristics. These areas consist of designated wilderness areas, wilderness study areas (WSAs), National Wild and Scenic Rivers, National Scenic and Historic Trails (NSHT), Areas of Critical Environmental Concern (ACECs), Desert Wildlife Management Areas (DWMAs), Habitat Management Areas (HMAs), Special Recreation Management Areas (SRMAs), inventoried lands with wilderness characteristics, and multiple-use classes. Most of these areas have been identified to protect unique characteristics and to contain resources identified as scientifically, educationally, biologically, or recreationally important.

These BLM-managed special management areas meet the direction of specific laws, policies, or proclamations that improve the manageability of the areas and allow the managing agency to preserve, protect, and evaluate significant components of national resource values. Depending on the specific designation, these special management areas are established administratively or by Congress or presidential proclamation. BLM has the authority to identify certain types of special management areas through the Resource Management Plan (RMP) amendment or revision process.

Congressional designations include wilderness, national conservation areas (NCAs), National Wild and Scenic River System, NSHTs, and national parks. National monuments are designated by presidential proclamation or, less commonly, by congressional designation. The Secretary of the Interior, or delegated officer, designates National Recreation Trails (NRTs) through a standardized process, including a recommendation and nomination by the BLM. NRTs provide a variety of compatible outdoor recreation uses. The NRT designation recognizes exemplary trails or local and regional significance and becomes a part of the National Trail System.

The BLM may apply administrative designations in areas requiring special management (not legislative). These include ACECs, streams eligible or suitable for inclusion in the National Wild and Scenic River System, and Back Country Byways. Land uses may be permitted in administratively designated areas to the extent that uses are in harmony with the purpose for which the area was designated. BLM may also identify areas with significant and important resources or features, such as wildlife management areas and recreation management areas. BLM has the authority under the Federal Land Policy and Management Act (FLPMA) to inventory features of the land, including those associated with the concept of wilderness or wilderness characteristics. Inventoried lands found to have

wilderness characteristics may be considered in land use planning decisions when BLM determines that those characteristics are reasonably present, of sufficient value and need, and practical to manage.

III.14.1 Regulatory Setting

III.14.1.1 Federal Land Policy and Management Act of 1976

FLPMA of 1976 (43 United States Code [U.S.C.] 1701 et seq.) established the multiple-use and sustained-yield management framework for public lands (43 U.S.C. 1701[a][7]). "Multiple use" features the following key tenets: (1) managing public lands and using various resource values in a combination that best meets the needs of the American people, (2) providing the most judicious use of the land for some or all of the resources over areas large enough to provide for periodic adjustments in use, and (3) using some land for less than all of the resources (43 U.S.C. 1702[c]).

In addition, multiple use refers to: (1) a combination of balanced and diverse resource uses that take into account the long-term needs of future generations for renewable and nonrenewable resources including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and (2) harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative resource values and not necessarily to the combination of uses that provides the greatest economic return or the greatest unit output (43 U.S.C. 1702[c]). "Sustained yield" is defined as the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of various renewable resources of the public lands consistent with multiple use (43 U.S.C. 1702[h]).

Congress directed that public lands be managed in a manner that protects the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values, and that where appropriate will preserve and protect certain public lands in their natural condition, that will provide food and habitat for fish, wildlife, and domestic animals, and that will provide for outdoor recreation and human occupancy and use (43 U.S.C. 1701(a)(8)). In addition, Congress directed that public lands be managed in a manner that recognizes the nation's need for domestic sources of minerals, food, timber, and fiber from the public lands (43 U.S.C. 1701[12]). The policies of FLPMA become effective upon enactment of specific statutory authority under the act or other provisions of law (43 U.S.C. 1701[b]).

FLPMA directs the Secretary of the Interior to prepare and maintain an inventory of all public lands and their resources and other values (43 U.S.C. 1711). In addition, the Secretary is directed to develop, maintain, and, when appropriate, revise land use plans (43 U.S.C. 1712). In developing and revising the land use plans, the Secretary must use

and observe principles of multiple use and sustained yield; achieve integrated consideration of physical, biological, economic, and other sciences; give priority to designation of ACECs; rely on the inventory of the public lands to the extent it is available; consider past and present uses of the public lands; consider the relative scarcity of values and available alternative means to realize those values; weigh the long-term benefits to the public against the short-term benefits; and provide for compliance with applicable pollution control laws including air, water, noise, or other pollution standards or implementation plans.

In addition, the Secretary is directed (to the extent consistent with the laws governing the administration of the public lands) to coordinate the land use inventory, planning, and management activities of or for such lands with the land use planning and management programs of other federal departments and agencies and of the states and local governments where the lands are located. These include, but are not limited to, the statewide outdoor recreation plans developed under the act of September 3, 1964 (78 Stat. 897), as amended (16 U.S.C. 4601–4 et seq.), and of or for Indian tribes by, among other things, considering the policies of approved state and tribal land resource management programs.

In implementing this directive, the Secretary shall, to the extent practical (1) keep apprised of state, local, and tribal land use plans; (2) assure that consideration is given to those state, local, and tribal plans that are germane in the development of land use plans for public lands; (3) assist in resolving inconsistencies between federal and nonfederal government plans, and (4) provide for meaningful public involvement of state and local government officials, both elected and appointed, in the development of land use programs, land use regulations, and land use decisions for public lands, including early public notice of proposed decisions that may have a significant impact on nonfederal lands. Such officials in each state are authorized to provide advice to the Secretary on the development and revision of land use plans, land use guidelines, land use rules, and land use regulations for the public lands within such state, and with respect to other land use matters as may be referred to them. Land use plans of the Secretary under this section shall be consistent with state and local plans to the maximum extent the Secretary finds consistent with federal law and the purposes of this act (43 U.S.C. 1712).

Title VI of FLPMA defines the California Desert Conservation Area (CDCA) as a designated management area. Most of the LUPA Decision Area is within the CDCA Plan boundary, which is addressed in Section 601 of FLPMA (43 U.S.C. 1781). Key portions of Section 601 follow:

1. The California desert contains historical, scenic, archaeological, environmental, biological, cultural, scientific, educational, recreational, and economic resources that are uniquely located adjacent to an area of large population.

2. The California desert environment is a total ecosystem that is extremely fragile, easily scarred, and slowly healed.
3. The California desert environment and its resources, including certain rare and endangered species of wildlife, plants, fishes, and numerous archaeological and historic sites, are seriously threatened by air pollution, inadequate federal management authority, and pressures from increased use, particularly recreational use, which are certain to intensify because of the rapidly growing population of Southern California.
4. The use of all California desert resources can and should be provided for in a multiple-use and sustained-yield management plan to conserve these resources for future generations, and to provide present and future use and enjoyment, particularly outdoor recreation uses, including the use, where appropriate, of off-road recreational vehicles.
5. To ensure further study of the relationship between people and the California desert environment; to preserve unique and irreplaceable resources, including archaeological values; and to conserve the use of the economic resources of the California desert, the public must be provided more opportunity to participate in such planning and management, Additional management authority must also be provided to the Secretary to facilitate effective implementation of such planning and management.

In summary, the purpose of the CDCA designation is "to provide for the immediate and future protection and administration of the public lands in the California desert within the framework of a program of multiple use and sustained yield, and the maintenance of environmental quality" (43 U.S.C. 1781[b]). The Secretary was directed to prepare and implement a comprehensive, long-range plan for the management, use, development, and protection of the public lands in the CDCA, taking into account the principles of multiple use and sustained yield in providing for resource use and development, including, but not limited to, maintenance of environmental quality, rights-of-way, and mineral development. The plan is known as the CDCA Plan of 1980, as amended.

III.14.1.2 Antiquities Act of 1906

The Antiquities Act of 1906 grants the president the authority to designate national monuments to protect objects of historic or scientific interest. While the president establishes most national monuments, Congress has also occasionally established national monuments protecting natural and historic features. Since 1906 the president and Congress have created more than 100 national monuments. National monuments are managed by BLM, the National Park Service (NPS), U.S. Forest Service (USFS), U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration, and the Department of Defense.

III.14.1.3 The Wilderness Act of 1964 (PL 88-577)

The Wilderness Act of 1964 created the legal definition of wilderness, established the National Wilderness Preservation System, and provided a formal mechanism for Congress to designate wilderness. The act also directed the Secretary of the Interior to review (within 10 years) every roadless area of 5,000 or more acres and review every roadless island (regardless of size) in national wildlife refuges and national parks. The Secretary then must recommend to the President the suitability of each area or island for inclusion in the National Wilderness Preservation System, with final decisions to be made by Congress. The act also directed the Secretary of Agriculture to study and recommend suitable areas in the USFS system. BLM-administered public lands were brought under the direction of the Wilderness Act with passage of FLPMA in 1976. Sections 603 and 201 of FLPMA also directed BLM to conduct inventories and make recommendations to the president for the suitability of areas to be included in the system (43 U.S.C. 1782, 1711).

The act provides criteria for determining suitability and restricts activities in a designated area. The act states that wilderness areas share the following common characteristics: A wilderness area generally appears to have been affected primarily by the forces of nature, with the imprint of human's work substantially unnoticeable. Wilderness areas also have outstanding opportunities for solitude or primitive and unconfined types of recreation such as hiking or fishing, and must comprise at least 5,000 acres of land or be of sufficient size as to make practical its preservation and use in an unimpaired condition. Wilderness areas may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

The Wilderness Act also determined the accepted and prohibited uses of designated wilderness areas. The act sets special provisions for an agency's continuing management of existing or grandfathered rights, such as mining and grazing, and other agency mission-related activities. Lands acquired through donation adjacent to designated wilderness may become part of the wilderness area if the Secretary of the Interior gives 60 days advance notice to the president, U.S. Senate, and the Speaker of the House of Representatives.

III.14.1.4 The Wild and Scenic Rivers Act of 1968

Congress passed the National Wild and Scenic Rivers Act in 1968 (Public Law [PL] 90-542; 16 U.S.C. 1271 et seq.) to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The act safeguards the special character of these rivers and recognizes their potential for appropriate use and development. It encourages river management that crosses political boundaries and promotes public participation in developing goals for river protection.

Congress or, if certain requirements are met, the Secretary of the Interior, may designate rivers under the Wild and Scenic Rivers Act upon petition by the governor of the state where a river segment lies. A federal agency administers each river segment. Designated segments need not include the entire river and may include tributaries. For federally administered rivers, the designated boundaries generally average 0.25 mile on either bank in the lower 48 states to protect river-related values.

The Wild and Scenic Rivers Act provides three levels of classification:

1. Wild rivers are free of dams, generally inaccessible except by trail, and represent vestiges of primitive America.
2. Scenic rivers are free of dams, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
3. Recreational rivers are readily accessible by road or railroad, may have some development along their shorelines, and may have been dammed in the past.

Any river or river segment on public lands found eligible for inclusion in National Wild and Scenic River System is to be managed to protect its outstanding remarkable values, free-flowing nature, and tentative classification until such time as a suitability determination is made. This requires management of public lands within 0.25 mile of the subject river or river segment to conform to management standards and guidelines presented in the BLM Manual 6400 for wild and scenic rivers.

III.14.1.5 The National Trails System Act of 1968

Congress enacted the National Trails System Act in 1968 (16 U.S.C. 1241-1251, as amended) to provide for the ever-increasing outdoor recreation needs of an expanding population, and to promote the preservation of, public access to, travel within, and enjoyment and appreciation of the open-air, outdoor areas and historic resources of the nation. The act states that trails should be established primarily near urban areas within scenic areas, and along historic travel routes that are often more remotely located.

The act also provides the means for attaining these objectives by instituting a national system of recreation, scenic, and historic trails, and prescribing the methods and standards by which additional components may be added to the system. Through the act, Congress recognized the valuable contributions that volunteers and private, nonprofit trail groups have made to the development and maintenance of the nation's trails. In recognition of these contributions, an additional purpose of the act is to encourage and assist voluntary citizen involvement in the planning, development, maintenance, and management of trails, where appropriate.

III.14.1.5.1 National Scenic Trail

A national scenic trail is defined as a continuous, long-distance, land-based trail at least 100-miles long, whose designation is established by an Act of Congress and is generally administered by either the Secretary of the Interior or Secretary of Agriculture in coordination with the trail-administering agency. A national scenic trail provides maximum compatible outdoor recreation opportunity, as well as the conservation and enjoyment of significant scenic, historic, natural, and cultural resources, qualities, values, and their associated settings. National scenic trails are found in desert, marsh, grassland, mountain, canyon, river, forest, and other areas, as well as other significant landforms. National scenic trails include the tread, or the trail path, and the trail setting included within the National Trail Management Corridor. National scenic trails may contain water sources or structures designed to support and provide for the safety of travelers along the trail.

III.14.1.5.2 National Historic Trail

A congressionally designated national historic trail is an extended, long-distance trail that can be land or water based and is not necessarily managed as continuous, but that follows as closely as possible original trails or routes of travel. Trails may be from any time period, and trails are considered nationally significant if they have had a far-reaching effect on American culture or are significant in the history of Native Americans. The purpose of a national historic trail is the identification and protection of a historic route and its historic remnants and artifacts that offer significant potential for public recreational use or historical interest based on historic interpretation and appreciation. A national historic trail is managed to recognize the nationally significant resources, qualities, values, and associated settings of the areas, including the primary use or uses of the trail associated with any of several broad historic themes such as trade and commerce, exploration, migration and settlement, and military campaigns. High-potential historic sites, high-potential route segments, and auto tour routes are federally identified and protected by the National Trail administering agency through the Trailwide Comprehensive Plan. Properties eligible for the National Register of Historic Places, which may also be federally protected, may be identified along the national historic trail, including segments of the national historic trail.

III.14.1.5.3 National Recreation Trail

The Secretary of the Interior or Secretary of Agriculture gives this designation to existing trails that contribute to health, conservation, and recreation goals in the United States. NRTs provide a variety of compatible outdoor recreation uses. Most NRTs are hiking trails, but a significant number are multiuse trails or bike paths. A few are water trails.

III.14.1.6 California Desert Protection Act of 1994

The California Desert Protection Act of 1994 (PL 103-433), was passed by Congress on October 8, 1994. This law established the Death Valley and Joshua Tree National Parks and the Mojave National Preserve in the California desert. The law also added 69 wilderness areas to the National Wilderness Preservation System in the CDCA. The law designated about 9.2 million acres of public lands in the CDCA.

The California Desert Protection Act recognizes the need to protect targeted desert wildland resources that face increasing threats. This protection is accomplished through the establishment of national parks, national preserves, wilderness areas, and other designations administered by federal agencies, including BLM. These areas are important to protect because of their "unique scenic, historical, archaeological, environmental, ecological, wildlife, cultural, scientific, educational, and recreational values used and enjoyed by millions of Americans for hiking and camping, scientific study and scenic appreciation" (PL 103-433).

III.14.1.7 The Omnibus Public Land Management Act of 2009

The Omnibus Public Land Management Act (Omnibus Act of 2009; PL 111–11),passed by Congress and signed into law on March 30, 2009, established the BLM's National Landscape Conservation System (NLCS) to provide for the coordinated protection of BLM-administered conservation lands. Title II of the act established the NLCS to include BLM-administered national monuments, NCAs, and other similar designations such as outstanding natural areas, WSAs, NSHTs, components of the National Trails System, wild and scenic rivers, components of the National Wild and Scenic River System, and wilderness components of the National Wilderness Preservation System.

Section 2002 further defines the NLCS "to conserve, protect and restore nationally significant landscapes that have outstanding cultural, ecological and scientific values for the benefit of current and future generations." In addition, Section 2002(d) of the law states that "public land within the California Desert Conservation Area administered by the BLM for conservation purposes" will be included in the NLCS.

The public lands in the NLCS are to be managed in accordance with applicable laws, regulations, and policy relating to any component of the system, in a manner that protects the values for which the components of the system were designated. The Omnibus Act of 2009 does not enhance, diminish, or modify any law under which the components of the system were established or managed, including the Wilderness Act of 1964, the Wild and Scenic Rivers Act of 1968, and the FLPMA of 1976.

The NLCS brings into a single system some of BLM's premier and iconic landscapes. Inclusion in the NLCS does not create any new legal protections for these lands, but it does

provide BLM managers with overall guidance and direction for management of the public lands within the NLCS. The NLCS lands within the LUPA Decision Area will be referred to as National Conservation Lands.

III.14.1.8 The California Desert Conservation Area Plan of 1980—Multiple-use Classes

The CDCA Plan of 1980 designated all BLM-administered public lands in the CDCA, except for a few small and scattered parcels, geographically into four multiple-use classes. The classifications were based on the sensitivity of resources and type of uses for each geographic area. Each multiple-use class describes a different type and level or degree of use, which is permitted within that geographic area. All land use actions and resource management activities on public lands within a multiple-use class delineation must meet the guidelines for each class. These multiple-use classes are described in detail in the CDCA Plan (BLM 1980, as amended).

The four multiple-use classes in the CDCA Plan are:

1. **Class C (Controlled Use):** These lands are to be managed and preserved in a natural state, and access generally is limited to nonmotorized, nonmechanized means (e.g., by foot or horseback). Motorized access is prohibited.
2. **Class L (Limited Use):** These lands are managed to protect sensitive, natural, scenic, ecological, and cultural resource values. They provide for generally lower intensity and carefully controlled multiple uses that do not significantly diminish resource values.
3. **Class M (Moderate Use):** These lands are managed in a controlled balance between higher intensity use and protection. A wide variety of uses, such as mining, livestock grazing, recreation, and energy and utility development are allowed. Any damage caused by permitted uses must be mitigated.
4. **Class I (Intensive Use):** These lands are managed for concentrated human use. Reasonable protection is provided for sensitive natural values, and mitigation of impacts and rehabilitation of impacted areas will occur when possible.

The Bishop and Caliente RMPs do not have guidelines for multiple-use classes and do not use these classifications.

III.14.1.9 Bureau of Land Management Manual 6100—National Landscape Conservation System

BLM Manual 6100 provides general policy to BLM personnel on managing public lands in the NLCS. The Omnibus Act of 2009 requires that NLCS units be managed "in a manner that

protects the values for which the components of the system were designated." This manual lists the designations identified in the act as components of the NLCS. The BLM has additional manuals addressing policy specific to national monuments, NCAs and similar designations, wilderness, WSAs, wild and scenic rivers, and NSHTs. National program policies that are applicable to all BLM public lands apply to lands in the NLCS to the extent they are consistent with the Omnibus Act of 2009, the designating legislation or proclamation, other applicable law, and BLM NLCS program policy.

III.14.1.10 Bureau of Land Management Manual 6320—Consideration of Lands with Wilderness Characteristics in the Land Use Planning Process

BLM Manual 6320 provides policy and guidance for considering lands with wilderness characteristics in the land use planning process. Managing wilderness resources is part of BLM's multiple-use mission. The BLM will use the land use planning process to determine how to manage lands with wilderness characteristics, as part of BLM's multiple-use mandate. When such lands are present, BLM will examine options for managing these lands and determine the most appropriate land use allocations for them. Considering wilderness characteristics in the land use planning process may result in several outcomes and include, but not be limited to (1) emphasizing other multiple uses as a priority over protecting wilderness characteristics, (2) emphasizing other multiple uses while applying management restrictions (e.g., conditions of use, mitigation measures) to reduce impacts to wilderness characteristics, and (3) protecting wilderness characteristics as a priority over other multiple uses. The BLM will continue to engage cooperating agencies, the public, and other interested parties in the land use planning process as it relates to the management of lands with wilderness characteristics.

Lands identified for protection of their wilderness characteristics in a land use plan are not managed as part of the National Wilderness Preservation System, the NLCS, or recommended as WSAs or for wilderness designation.

III.14.1.11 Bureau of Land Management Manual 6330—Management of Wilderness Study Areas

BLM Manual 6330 provides policy guidance on the non-impairment standard to BLM personnel, for BLM's use when managing WSAs that are part of the BLM's NLCS. This policy specifically applies to (1) WSAs identified by the wilderness review required by Section 603 of FLPMA and currently under review by Congress (including "Instant Study Areas"), sometimes referred to as "603 WSAs;" (2) legislative WSAs (established by Congress); and (3) WSAs identified during the land use planning process under Section 202 of FLPMA, sometimes referred to as "202 WSAs." This policy includes 202 WSAs identified after wilderness study reports were submitted to Congress. This policy does

not apply to areas designated by Congress as wilderness, or to other lands that may have wilderness characteristics.

BLM's objectives for implementing this policy are to:

1. Manage and protect WSAs, consistent with relevant law, to preserve wilderness characteristics so those areas do not become unsuitable for wilderness designation by Congress.
2. Provide policy guidance for prolonged stewardship of WSAs until Congress makes a final determination on the management of WSAs.

III.14.1.12 Bureau of Land Management Manual 6340—Management of Designated Wilderness

BLM Manual 6340 provides guidance to BLM personnel on managing BLM lands that have been designated by Congress as part of the National Wilderness Preservation System. These lands are also managed as part of the NLCS. The BLM's objectives for implementing this policy are to:

1. Manage and protect BLM wilderness areas in such a manner as to preserve wilderness characteristics.
2. Manage wilderness for the public purposes of recreational, scenic, scientific, educational, conservation, and historic use while preserving wilderness characteristics.
3. Effectively manage uses permitted under Sections 4(c) and 4(d) of the Wilderness Act, while preserving wilderness characteristics.

III.14.1.13 Bureau of Land Management Manual 6220—National Monuments, National Conservation Areas, and Similar Designations (Public)

BLM Manual 6220 provides guidance to BLM personnel on managing public lands that are components of the BLM's NLCS and have been designated by Congress or the president as national monuments, NCAs, or similar designations (collectively "Monuments and NCAs" or "components"), and other areas that may be established in the future by Congress, pursuant to the Omnibus Act of 2009. Under Section 2002 of this act, the NLCS was established "to conserve, protect, and restore nationally significant landscapes that have outstanding cultural, ecological, and scientific values for the benefit of current and future generations."

National program policies that generally apply to BLM public lands also apply to NLCS components to the extent that they are consistent with the designating proclamation or legislation, other applicable law, and BLM policy.

The BLM's objectives in implementing the policy are to:

A. Comply with designating Acts of Congress and presidential proclamations by conserving, protecting, and restoring the objects and values for which Monuments and NCAs were designated for the benefit of present and future generations.

B. Effectively manage valid existing rights and compatible uses within Monuments and NCAs.

C. Manage discretionary uses within Monuments and NCAs to ensure the protection of the objects and values for which the Monuments and NCAs were designated.

D. Use science, local knowledge, partnerships, and volunteers to effectively manage Monuments and NCAs.

E. Provide appropriate recreational opportunities, education, interpretation, and visitor services to enhance the public's understanding and enjoyment of the Monuments and NCAs.

III.14.1.14 Bureau of Land Management Manual 6280—Management of National Scenic and Historic Trails and Trails Under Study or Recommendation as Suitable for Congressional Designation

BLM Manual 6280 provides BLM managers and program staff professionals with policies for the management of NSHTs. Specifically, this manual identifies requirements for the management of trails undergoing National Trail Feasibility Study; trails recommended as suitable for national trail designation through the National Trail Feasibility Study; inventory, planning, management, and monitoring of designated NSHTs; and data and records management requirements for NSHTs. While a trail is undergoing a National Trail Feasibility Study, or when a trail is recommended as suitable for designation and Congress has not yet acted to designate it, BLM manages the values, characteristics, and settings of the trail in accordance with FLPMA.

BLM Manual 6280 describes the statutory requirements and policy guidance for managing trails under study or recommended as suitable, including the requirements and goals for such trails during the land use planning process. The manual also describes the statutory requirements and policy guidance for the management of designated trails, including those related to inventory, land use planning, management, and monitoring. The manual indicates the trail's stage in the National Trail designation process and, for congressionally designated National Trails, identifies its order in the steps of the land use planning process.

III.14.1.15 Bureau of Land Management Manual 6400—Wild and Scenic Rivers—Policy and Program Direction for Identification, Evaluation, Planning, and Management

BLM Manual 6400 provides policy and program direction for the identification, evaluation, and management of eligible and suitable wild and scenic rivers and the management of designated components of the National Wild and Scenic Rivers System. This program guidance fulfills obligations contained in the Wild and Scenic Rivers Act of 1968, as amended, and other relevant laws and policies. BLM's NLCS manages eligible and suitable wild and scenic rivers that are inside an NLCS unit. BLM's Natural Resources and Planning assistant director manages eligible and suitable rivers that are outside an NLCS unit.

Manual 6400 policies and program guidance are consistent with the NLCS mission to conserve, protect, and restore nationally significant landscapes. The Wild and Scenic Rivers Act of 1968 currently protects more than 200 rivers in 35 states and Puerto Rico.

The objectives of this guidance are to:

1. Comply with the Wild and Scenic River Act, subject to valid existing rights, by protecting and enhancing the free-flowing condition, water quality, and outstanding remarkable values of each designated wild and scenic river.
2. Comply with the Wild and Scenic River Act and FLPMA, subject to valid existing rights, by identifying, evaluating, and managing potential additions to the national system.
3. Develop and consider management alternatives during the land use planning process and during project- and activity-level analysis that would protect and, where feasible, enhance the free-flowing condition, water quality, and outstanding remarkable values of BLM-identified eligible and suitable rivers.
4. Protect the free-flowing condition, water quality, and outstanding remarkable values of congressionally authorized study rivers in accordance with the Wild and Scenic River Act and FLPMA.

III.14.2 Bureau of Land Management Special Designations, Classifications, Allocations, and Lands With Wilderness Characteristics

The following section provides the setting for BLM Special Designations, Classifications, Allocations, and lands with wilderness characteristics within the LUPA Decision Area.

III.14.2.1 National Conservation Lands

BLM identifies lands that are components of the NLCS as National Conservation Lands. Approximately 3.9 million acres in the CDCA, including wilderness, wild and scenic rivers, NSHTs, and other special areas are components of the National Conservation Lands, as identified by Congress. Additionally, PL 111-11 states that public land in the CDCA that BLM administers for conservation purposes is to be included in the NLCS. These lands, which include DWMAs, ACECs, and HMAs under current land use planning documents, are managed primarily for conservation purposes, but BLM is considering whether to continue to include these lands as conservation lands in the NLCS through this planning effort. BLM will determine (1) which lands should continue to be managed for conservation purposes, and (2) which lands managed for conservation under the Proposed LUPA meet the criteria for inclusion in the NLCS.

III.14.2.1.1 Wilderness

The BLM, USFS, NPS, and USFWS all manage congressionally designated wilderness as part of the National Wilderness Preservation System. Wilderness in California is managed according to the Wilderness Act of 1964, the California Desert Protection Act of 1994, the Omnibus Act of 2009, regulations for wilderness management (43 Code of Federal Regulations [CFR] 6300, BLM Manual 6340), and wilderness management plans.

Wilderness is generally managed to preserve the area in its natural state, to keep it undeveloped and untrammeled by human actions, and to provide opportunities for solitude and primitive forms of recreation. Travel in wilderness areas is limited to travel on foot or by horseback. Motorized vehicles, bicycles, and other forms of mechanized equipment are prohibited in these areas to protect the solitude, primitive nature, and biological values of these special places. The Wilderness Act reserved to Congress the right to make future wilderness designations. Each wilderness designation has supporting documentation that explains specific values and prohibitions.

The LUPA Decision Area contains approximately 6 million acres of designated wilderness, including NPS, USFWS, and BLM wilderness areas. There are approximately 3.5 million acres of BLM-managed wilderness in the LUPA Decision Area as shown in Table III.14-1 and Figure III.14-1.

Table III.14-1
Designated Wilderness Acres within the LUPA Decision Area

Wilderness	Acres	% of LUPA Decision Area
Cadiz Valley and Chocolate Mountains	**813,000**	**3.6%**
Big Maria Mountains Wilderness	48,000	0.2%
Cadiz Dunes Wilderness	21,000	0.1%
Chuckwalla Mountains Wilderness	102,000	0.4%
Indian Pass Wilderness (in 2 ecoregion subareas)	32,000	0.1%
Little Chuckwalla Mountains Wilderness	29,000	0.1%
Little Picacho Wilderness (in 2 ecoregion subareas)	34,000	0.2%
Old Woman Mountains Wilderness	64,000	0.3%
Palen/McCoy Wilderness	247,000	1.1%
Palo Verde Mountains Wilderness	32,000	0.1%
Picacho Peak Wilderness (in 2 ecoregion subareas)	6,000	0.0%
Rice Valley Wilderness	43,000	0.2%
Riverside Mountains Wilderness	25,000	0.1%
Sheephole Valley Wilderness (in 2 ecoregion subareas)	45,000	0.2%
Stepladder Mountains Wilderness (in 2 ecoregion subareas)	1,000	0.0%
Turtle Mountains Wilderness (in 2 ecoregion subareas)	83,000	0.4%
Whipple Mountains Wilderness (in 2 ecoregion subareas)	1,000	0.0%
Imperial Borrego Valley	**54,000**	**0.2%**
Coyote Mountains Wilderness	10,000	0.0%
Fish Creek Mountains Wilderness	6,000	0.0%
Indian Pass Wilderness (in 2 ecoregion subareas)	1,000	0.0%
Jacumba Wilderness	4,000	0.0%
Little Picacho Wilderness (in 2 ecoregion subareas)	4,000	0.0%
North Algodones Dunes Wilderness	26,000	0.1%
Orocopia Mountains Wilderness		0.0%
Picacho Peak Wilderness (in 2 ecoregion subareas)	3,000	0.0%
Kingston and Funeral Mountains	**640,000**	**2.8%**
Funeral Mountains Wilderness	28,000	0.1%
Hollow Hills Wilderness	14,000	0.1%
Ibex Wilderness	31,000	0.1%
Kingston Range Wilderness (in 2 ecoregion subareas)	193,000	0.9%
Mesquite Wilderness	48,000	0.2%
Nopah Range Wilderness	111,000	0.5%
North Mesquite Mountains Wilderness	30,000	0.1%
Pahrump Valley Wilderness	77,000	0.3%

Table III.14-1
Designated Wilderness Acres within the LUPA Decision Area

Wilderness	Acres	% of LUPA Decision Area
Resting Spring Range Wilderness	81,000	0.4%
Saddle Peak Hills Wilderness	2,000	0.0%
South Nopah Range Wilderness	18,000	0.1%
Stateline Wilderness	7,000	0.0%
Mojave and Silurian Valley	**172,000**	**0.8%**
Black Mountain Wilderness	15,000	0.1%
Bristol Mountains Wilderness (in 2 ecoregion subareas)	17,000	0.1%
Golden Valley Wilderness (in 3 ecoregion subareas)	29,000	0.1%
Grass Valley Wilderness (in 2 ecoregion subareas)	25,000	0.1%
Hollow Hills Wilderness	9,000	0.0%
Kelso Dunes Wilderness (in 2 ecoregion subareas)	52,000	0.2%
Kingston Range Wilderness (in 2 ecoregion subareas)	18,000	0.1%
Newberry Mountains Wilderness (in 2 ecoregion subareas)	4,000	0.0%
Rodman Mountains Wilderness (in 2 ecoregion subareas)	3,000	0.0%
Owens River Valley	**11,000**	**0.05%**
Coso Range Wilderness	5,000	0.0%
Inyo Mountains Wilderness	1,000	0.0%
Malpais Mesa Wilderness	2,000	0.0%
Sacatar Trail Wilderness	3,000	0.0%
Panamint Death Valley	**37,000**	**0.2%**
Argus Range Wilderness	9,000	0.0%
El Paso Mountains Wilderness	17,000	0.1%
Golden Valley Wilderness (in 3 ecoregion subareas)		0.0%
Manly Peak Wilderness	200	0.0%
Surprise Canyon Wilderness	11,000	0.0%
Pinto Lucerne Valley and Eastern Slopes	**167,000**	**0.7%**
Bighorn Mountain Wilderness	27,000	0.1%
Cleghorn Lakes Wilderness	19,000	0.1%
Newberry Mountains Wilderness (in 2 ecoregion subareas)	24,000	0.1%
Pinto Mountains Wilderness	25,000	0.1%
Rodman Mountains Wilderness (in 2 ecoregion subareas)	31,000	0.1%
San Gorgonio Wilderness	41,000	0.2%
Piute Valley and Sacramento Mountains	**415,000**	**1.8%**
Bigelow Cholla Garden Wilderness (in 2 ecoregion subareas)	13,000	0.1%
Chemehuevi Mountains Wilderness	86,000	0.4%

Table III.14-1
Designated Wilderness Acres within the LUPA Decision Area

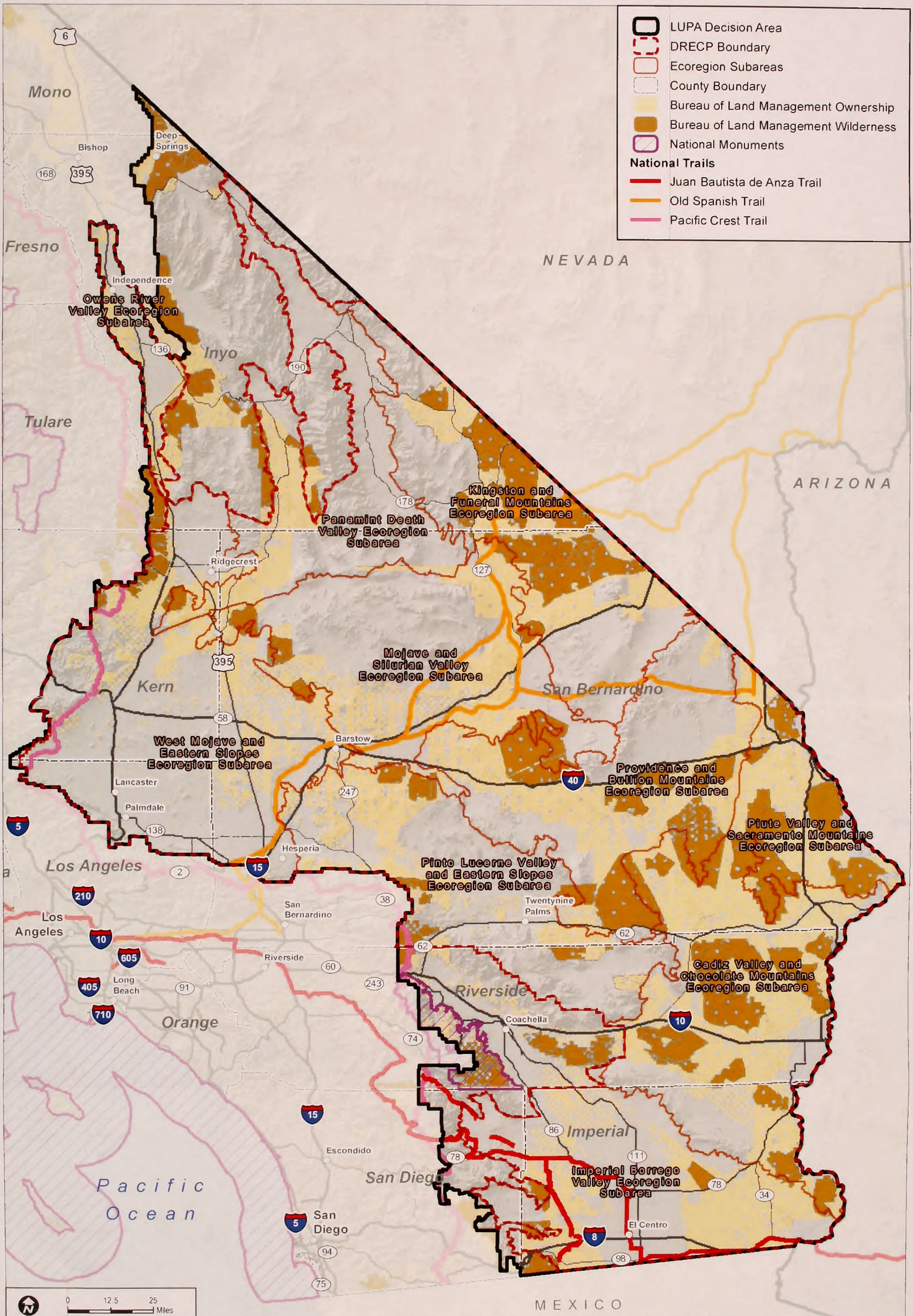
Wilderness	Acres	% of LUPA Decision Area
Dead Mountains Wilderness	54,000	0.2%
Stepladder Mountains Wilderness (in 2 ecoregion subareas)	83,000	0.4%
Turtle Mountains Wilderness (in 2 ecoregion subareas)	100,000	0.4%
Whipple Mountains Wilderness (in 2 ecoregion subareas)	79,000	0.3%
Providence and Bullion Mountains	**582,000**	**2.6%**
Bigelow Cholla Garden Wilderness (in 2 ecoregion subareas)	2,000	0.0%
Bristol Mountains Wilderness (in 2 ecoregion subareas)	60,000	0.3%
Cleghorn Lakes Wilderness	21,000	0.1%
Clipper Mountain Wilderness	36,000	0.2%
Kelso Dunes Wilderness (in 2 ecoregion subareas)	102,000	0.5%
Old Woman Mountains Wilderness	120,000	0.5%
Piute Mountains Wilderness	50,000	0.2%
Sheephole Valley Wilderness (in 2 ecoregion subareas)	151,000	0.7%
Trilobite Wilderness	40,000	0.2%
West Mojave and Eastern Slopes	**90,000**	**0.4%**
Black Mountain Wilderness	6,000	0.0%
Bright Star Wilderness	8,000	0.0%
El Paso Mountains Wilderness	7,000	0.0%
Golden Valley Wilderness (in 3 ecoregion subareas)	7,000	0.0%
Grass Valley Wilderness (in 2 ecoregion subareas)	8,000	0.0%
Kiavah Wilderness	22,000	0.1%
Owens Peak Wilderness	32,000	0.1%
CDCA Area outside the DRECP boundary	**621,000**	**2.76%**
Argus Range Wilderness	56,000	0.2%
Bright Star Wilderness	1,000	0.0%
Carrizo Gorge Wilderness	3,000	0.0%
Coso Range Wilderness	44,000	0.2%
Coyote Mountains Wilderness	9,000	0.0%
Darwin Falls Wilderness	8,000	0.0%
Death Valley Wilderness	1,000	0.0%
Fish Creek Mountains Wilderness	16,000	0.1%
Inyo Mountains Wilderness	80,000	0.4%
Jacumba Wilderness	28,000	0.1%
Malpais Mesa Wilderness	30,000	0.1%
Manly Peak Wilderness	13,000	0.1%

Table III.14-1
Designated Wilderness Acres within the LUPA Decision Area

Wilderness	Acres	% of LUPA Decision Area
Mecca Hills Wilderness	26,000	0.1%
Orocopia Mountains Wilderness	53,000	0.2%
Owens Peak Wilderness	18,000	0.1%
Piper Mountain Wilderness	72,000	0.3%
Sacatar Trail Wilderness	31,000	0.1%
San Gorgonio Wilderness	13,000	0.1%
Santa Rosa Wilderness	63,000	0.3%
Surprise Canyon Wilderness	14,000	0.1%
Sylvania Mountains Wilderness	19,000	0.1%
White Mountains Wilderness	23,000	0.1%
Total	**3,602,000**	**16.0%**

Notes: Acres are based on GIS data and may not match wilderness designation documents.
The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.
Source: BLM 2015

BLM and NPS are the primary wilderness managers within the LUPA Decision Area. BLM administers more than half the designated wilderness areas within the LUPA Decision Area, with approximately 3.6 million acres, followed by approximately 2.9 million acres of NPS-administered wilderness, and over 9,000 acres of USFWS-administered wilderness. NPS wilderness areas found within the LUPA Decision Area include Joshua Tree Wilderness, Death Valley Wilderness, and the Mojave Wilderness. USFWS wilderness areas include the Imperial Refuge Wilderness and Havasu Wilderness. See Chapter III.18, Outdoor Recreation, for additional information on NPS-managed wilderness.



Sources: ESRI (2014); BLM (2015); RECON (2015)

FIGURE III.14-1

Wilderness Areas, National Monuments, and National Historic and Scenic Trails Managed by BLM within the LUPA Decision Area

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III.14.2.1.2 Wild and Scenic Rivers

Congressionally Designated River Segments

The Amargosa River is one of two congressionally designated wild and scenic rivers within the LUPA Decision Area (Figure III.14-2). Different segments of the Amargosa River—from south of Shoshone to an area east of the Death Valley Wilderness Area—have been designated as either wild, scenic, or recreational. Within the LUPA Decision Area, 22.7 miles of the Amargosa River are on BLM-administered lands (specifically 8.46 miles designated as scenic, 8.17 designated as wild, and 6.07 designated as recreational). An interim river corridor boundary extending, on average, one-quarter mile from both sides of the high-water mark has been identified for protective management until a formal corridor is finalized through the Comprehensive River Management Plan (CRMP) (currently under development). For the Amargosa River, this corridor covers approximately 6,100 acres of BLM-administered lands, 300 acres of State of California lands, and 900 acres of unclassified lands, for a total of 7,279 acres.

BLM will protect and enhance the Outstanding Remarkable Values, water quality, and free-flowing condition of the two Wild and Scenic Rivers and maintain each river segments classification as required by the Wild and Scenic Rivers Act.

Eligible Wild and Scenic River Segments

The BLM is required to determine if river segments are eligible for designation under the Wild and Scenic Rivers Act and to provide for protective management of these segments until a suitability determination can be completed. Considerations for National Wild and Scenic Rivers System eligibility are based on the free-flowing nature of the segment, water quality, and the presence of outstandingly remarkable values as defined by the act.

Eligibility determinations and tentative classifications have been made for the stream segments within the LUPA Decision Area through existing planning efforts as follows.

Mojave River: The West Mojave Plan Amendment (2006) includes an eligibility determination for the Mojave River, and found that a 2.9-mile segment near Afton Canyon meets the eligibility requirements and therefore is eligible for potential inclusion into the National Wild and Scenic Rivers System. The eligible segment on public lands contains outstandingly remarkable scenic values (i.e., Class "A" scenic quality), per BLM Manual guidelines. Public lands in this segment have been previously designated as an ACEC in part because of spectacular scenery. Regionally rare plant communities such as cottonwood-willow riparian forest, willow riparian scrub, mesquite bosque, as well as alkaline meadow and emergent plant communities can also be found along this portion of the river. These plant communities support wildlife including a high percentage of neotropical migrant

birds and local or regional disjuncts. The federally listed threatened Mojave desert tortoise is found near this segment, as well as a range of other sensitive and/or special concern species. The presence of flowing water in this segment has served to attract humans for thousands of years. The high relief, stark topography and lush riparian vegetation provided by this segment continue to offer many opportunities for nonintrusive recreation.

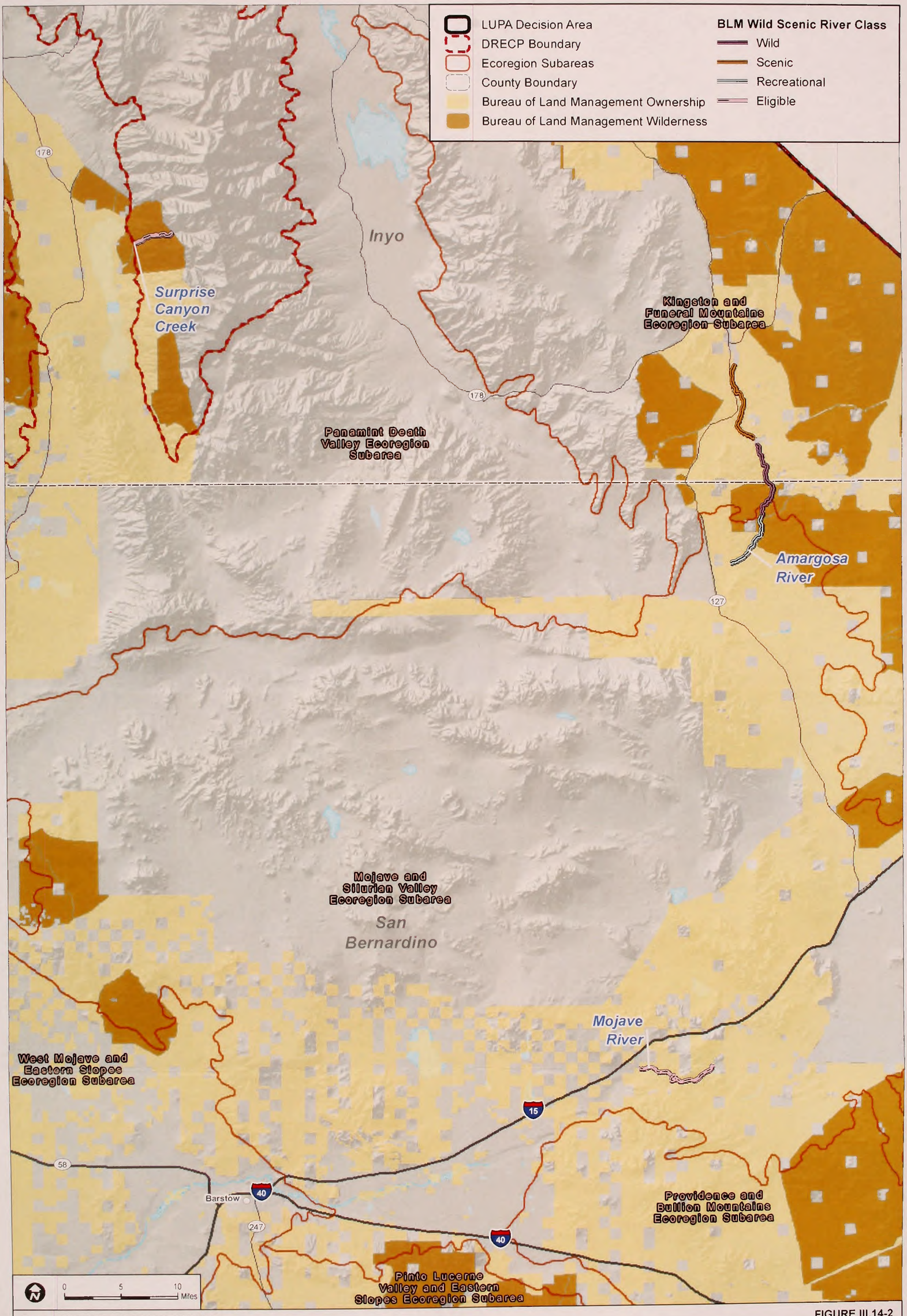
The suitability analysis for the Mojave River was not completed in the respective plan amendments. The suitability analysis is being deferred under the Proposed LUPA as it is outside the scope of this targeted plan amendment. Therefore, this stream segment will remain under interim protective management until a suitability determination is made.

The full eligibility report for the Mojave River can be found in Appendix F of the West Mojave Plan Amendment (2006).

Surprise Canyon Creek: The Northeast Mojave Plan Amendment (2002) found that 5 miles of Surprise Canyon Creek from the boundary of Death Valley National Park to the ACEC boundary is eligible for wild and scenic river designation with the upper 4 miles tentatively classified as wild and the lower 1 mile as scenic. Surprise Canyon supports extensive cottonwood/willow streamside woodland, considered an "unusual plant assemblage" in the CDCA Plan. This multistoried woodland covers approximately 2 miles of the total stream reach and is the most extensive riparian system in the Panamint Mountains. The remaining 3 miles of the stream reach is composed of other riparian/wetland dependent vegetation.

Surprise Canyon Creek also supports a basic saxicole plant assemblage, another unusual plant assemblage. Several federal sensitive species have been located in Surprise Canyon in these limestone outcrops including Panamint dudleya (*Dudleya saxosa* ssp. *saxosa*) and Death Valley round-leaved phacelia (*Phacelia mustelina*). The talus slopes in the canyon also support another federal sensitive species endemic to the Panamint Mountains, the Panamint daisy (*Enceliopsis covillei*). The diversity of vegetative communities in Surprise Canyon contributes to providing niches for a diverse wildlife community, one of the most diverse and significant in the CDCA.

Surprise Canyon provides an exceptional semi-primitive recreation opportunity. The canyon bottom forms a corridor through the rugged 29,180-acre Surprise Canyon Wilderness. The designation-eligible segments of Surprise Canyon offer outstanding hiking, bird watching, botanizing, photography, and backpacking opportunities. The hike from Chris Wicht Camp along this perennial stream and through the narrow slot canyon to the abandoned ghost town of Panamint City is one of the most outstanding treks in the California Desert.



Sources: ESRI (2014), BLM (2015), RECON (2015)

FIGURE III.14-2

Wild and Scenic Rivers Managed by BLM within the LUPA Decision Area

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The suitability analysis for Surprise Canyon Creek was not completed in the respective plan amendments. The suitability analysis is being deferred under the Proposed LUPA as it is outside the scope of this targeted plan amendment. Therefore, this stream segment will remain under interim protective management until a suitability determination is made.

The full eligibility report for Surprise Canyon Creek can be found in Appendix T of the Northeast Mojave Plan Amendment (2002).

III.14.2.1.3 National Monuments

The Santa Rosa and San Jacinto Mountains National Monument, which encompasses about 272,000 acres (94,600 on BLM-managed land), is in the LUPA Decision Area (see Figure III.14-1).

III.14.2.1.4 National Scenic and Historic Trails

The BLM, NPS, USFS, and several other agencies are responsible for the management of NSHTs. NSHTs in the LUPA Decision Area include the Pacific Crest National Scenic Trail, the Juan Bautista de Anza National Historic Trail, and the Old Spanish National Historic Trail.

Pacific Crest National Scenic Trail

Approximately 182 miles of the Pacific Crest National Scenic Trail passes through the LUPA Decision Area, primarily in the Pinto and Lucerne Valley ecoregion subarea and in the West Mojave and Eastern Slopes ecoregion subarea (see Figure III.14-1). Approximately 69 miles of the Pacific Crest National Scenic Trail are on BLM-managed lands in the LUPA Decision Area.

Juan Bautista de Anza National Historic Trail

Approximately 159 miles of the 1,210-mile Juan Bautista de Anza National Historic Trail alignment (in California and Arizona) are in the Imperial Borrego Valley ecoregion subarea (see Figure III.14-1). Approximately 26 miles of the Juan Bautista de Anza National Historic Trail are on BLM-managed lands in the LUPA Decision Area.

Old Spanish National Historic Trail

Approximately 367 miles of the Old Spanish National Historic Trail are within the LUPA Decision Area and cross six of the ecoregion subareas (see Figure III.14-1). Approximately 139 miles are on BLM-managed lands in the LUPA Decision Area.

Under the existing condition, these trails do not have a designated trail corridor or easement. However, BLM has easements and rights-of-way between 15 to 50 feet across segments of

the Pacific Crest National Scenic Trail that cross private land in accordance with BLM policy and the National Trail System Act.

Visual resources along these trails are described in Chapter III.20. The baseline includes more than 50 renewable energy projects recently completed or under construction within the LUPA Decision Area. These projects are listed in Appendix O and shown in Figure III.1-1 (see Section III.1.3.3). Some existing projects would have indirect impacts on NSHTs, such as the Ocotillo Express Wind project that is in close proximity to the Juan Bautista de Anza National Historic Trail. These projects have been assessed for their impacts on NSHTs.

III.14.2.1.5 Wilderness Study Areas

To achieve the mandate of Section 603 of FLPMA, BLM developed a three-phase wilderness review process: inventory, study, and reporting. The inventory phase of this process, initiated in 1978, involves examining public lands to determine and locate the existence of areas containing wilderness characteristics that meet criteria under the Wilderness Act. Areas clearly lacking wilderness characteristics were sorted out from lands that might have those characteristics. This intensive inventory was then followed by a 90-day public review period, after which final WSAs were identified. This inventory process and a general description of all of the WSAs in the CDCA are in the CDCA Wilderness Inventory (1979) and the Record of Decision for wilderness recommendations in the California Statewide Wilderness Study Report (1991).

To be designated as a WSA, an area must have the following characteristics:

- Size—comprise roadless areas of at least 5,000 acres of public lands, or of a manageable size
- Naturalness—generally appears to have been affected primarily by the forces of nature
- Opportunities—provides outstanding opportunities for solitude or primitive and unconfined types of recreation

In addition, WSAs often have special qualities such as ecological, geological, educational, historical, scientific, and scenic values. Since 1980, Congress has reviewed these areas, designating some as wilderness, designating some to remain in WSA status (CDPA 1994), and releasing others for nonwilderness uses. Until Congress makes a final determination on a WSA, BLM manages these areas to preserve their suitability for future designation as wilderness. In the LUPA Decision Area, WSAs encompass approximately 390,000 acres on BLM-managed lands (Table III.14-2 and Figure III.14-3). For the more than 50 renewable energy projects recently completed or under construction within the LUPA Decision Area included in the baseline, none are near WSAs.

Table III.14-2
Wilderness Study Area Acres within BLM-administered Lands in the LUPA Decision Area

Wilderness Study Areas	Total Acres
Cadiz Valley and Chocolate Mountains	
Imperial Borrego Valley	
Kingston and Funeral Mountains	
Kingston Range WSA (occurs in 2 ecoregion subareas)	12,000
Mojave and Silurian Valley	
Avawatz Mountains WSA	50,000
Cady Mountains WSA (occurs in 2 ecoregion subareas)	47,000
Death Valley 17 WSA (occurs in 2 ecoregion subareas)	27,000
Kingston Range WSA (occurs in 2 ecoregion subareas)	28,000
Soda Mountains WSA	114,000
Owens River Valley	
Cerro Gordo WSA	1,000
Crater Mountain WSA	1,000
Independence Creek WSA	6,000
Southern Inyo WSA	3,000
Symmes Creek WSA	8,000
Panamint Death Valley	
Death Valley 17 WSA (occurs in 2 ecoregion subareas)	24,000
Great Falls Basin WSA	1,000
Pinto Lucerne Valley and Eastern Slopes	
Piute Valley and Sacramento Mountains	
Providence and Bullion Mountains	
Cady Mountains WSA (occurs in 2 ecoregion subareas)	59,000
West Mojave and Eastern Slopes	
CDCA Area outside the DRECP boundary	
Great Falls Basin WSA	7,000
White Mountains WSA	2,000
Total	**390,000**

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total in the table.
Source: BLM 2015

III.14.2.2 Areas of Critical Environmental Concern

Under 43 CFR 1610.7-2, BLM is directed to identify areas having potential for ACEC designation and protection management through the land use planning process. To qualify as an ACEC, an area must contain resources, values, systems or processes, or hazards eligible that meet the relevance and importance criteria.

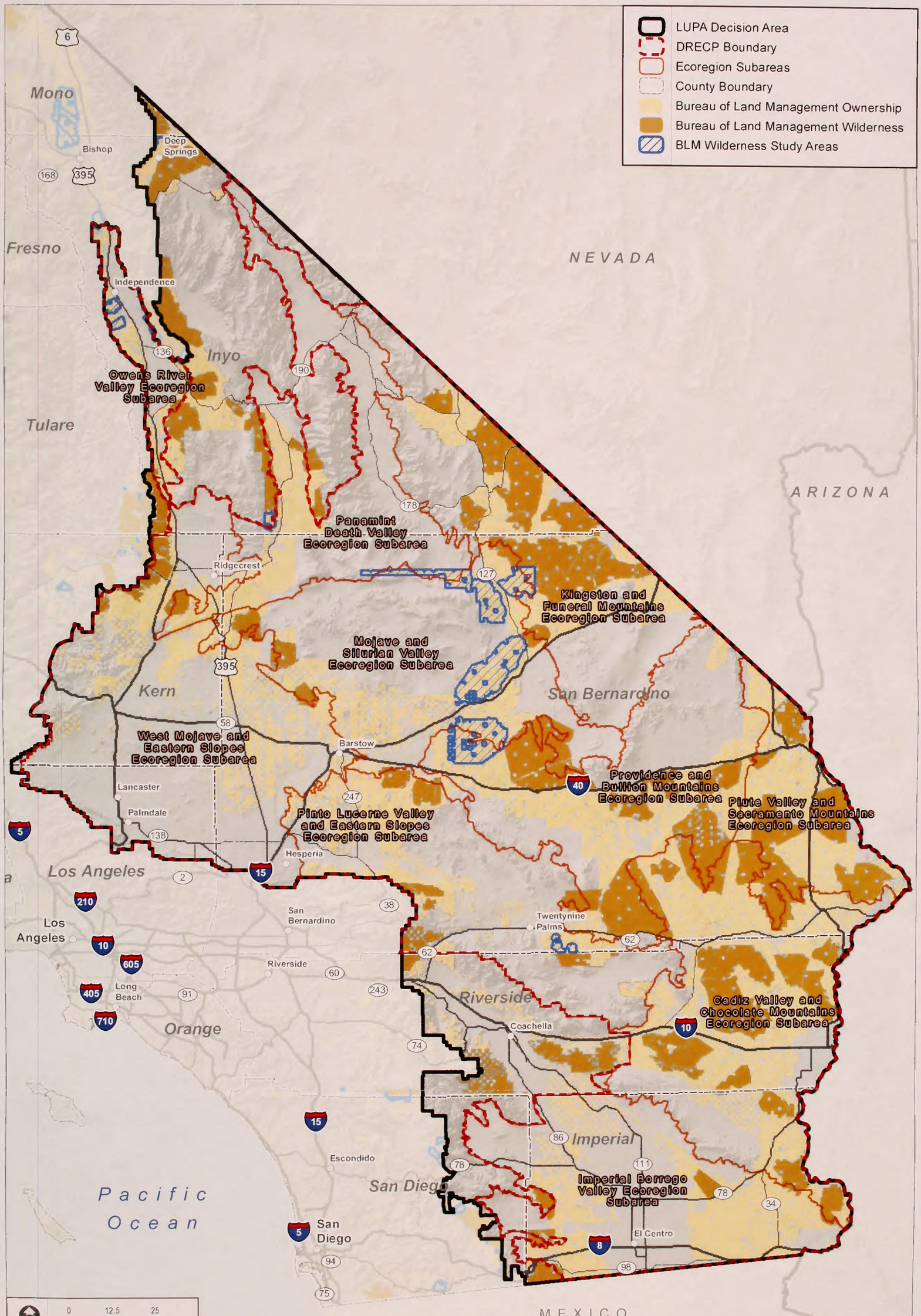
To meet the relevance criteria, there shall be present a significant historic, cultural, or scenic value; a fish or wildlife resource or other natural system or process; or natural hazard. To meet the importance criteria, the resource must have substantial significance and values. This generally requires qualities of more than local significance and special worth, consequence, meaning, distinctiveness, or cause for concern. A natural hazard can be important if it is a significant threat to human life or property.

The CDCA Plan states that the ACEC program goals are to:

1. Identify and protect significant natural and cultural resources requiring special management attention found on BLM-administered lands in the CDCA
2. Provide for other uses in the designated areas, compatible with the protection and enhancement of the significant natural and cultural resources
3. Systematically monitor the preservation of significant natural and cultural resources on BLM-administered lands and the compatibility of other allowed uses with these resources (BLM 1980, as amended)

One ACEC, Horse Canyon, is in the Caliente RMP (Bakersfield Field Office). The objective for the Horse Canyon ACEC is to manage the protection and preservation of significant cultural resources, traditional lifeway values, and natural resources. According to the management prescriptions, the Horse Canyon ACEC is:

- Open for leasing of oil, gas, and geothermal resources, subject to no surface use
- Unavailable for livestock grazing due to other resource concerns



Sources: ESRI (2014), BLM (2015), RECON (2015)

FIGURE III.14-3

Wilderness Study Areas within the LUPA Decision Area

DRECP Proposed LUPA and Final EIS

October 2015

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The LUPA Decision Area would not overlap with existing ACECs managed under the Bishop RMP.

For the more than 50 renewable energy projects recently completed or under construction within the LUPA Decision Area included in the baseline, ACECs have been assessed under each project's environmental analysis, where appropriate. For example, the five projects on BLM-administered land, the Ivanpah Solar Electric Generating System, Ocotillo Express Wind, Alta East Wind, Genesis NextEra, and Desert Sunlight Solar Farm are all near BLM ACECs. The Ocotillo Express Wind project is also near the Flat-tailed Horned Lizard Management Area in Imperial County. Impacts to these resources were addressed in each project's environmental analysis.

III.14.2.2.1 Areas of Critical Environmental Concern

There are currently over 80 ACECs within BLM-administered lands in the LUPA Decision Area (Figure III.14-4). Table III.14-3 shows the ACEC acres by ecoregion subarea and CDCA Plan area outside the DRECP boundary.

Table III.14-3
ACEC Acres within BLM-Managed Lands in the LUPA Decision Area

Areas of Critical Environmental Concern	Acres
Cadiz Valley and Chocolate Mountains (All within CDCA)	
Alligator Rock ACEC	7,000
Chuckwalla Valley Dune Thicket ACEC	2,000
Corn Springs ACEC	2,000
Desert Lily Preserve ACEC	2,000
Indian Pass ACEC (occurs in 2 ecoregion subareas)	100
Mopah Spring ACEC (occurs in 2 ecoregion subareas)	200
Mule Mountains ACEC	4,000
Palen Dry Lake ACEC	4,000
Patton's Iron Mountain Divisional Camp ACEC	16,000
Turtle Mountains NNL ACEC (occurs in 2 ecoregion subareas)	8,000
Whipple Mountains ACEC (occurs in 2 ecoregion subareas)	1,000
Imperial Borrego Valley (All within CDCA)	
Coyote Mountains Fossil Site ACEC	1,000
East Mesa ACEC	38,000
Indian Pass ACEC (occurs in 2 ecoregion subareas)	2,000
Lake Cahuilla – A, B, C, and D ACEC (aggregate)	8,000
North Algodones Dunes NNL ACEC	26,000
Pilot Knob ACEC	900
Plank Road ACEC	300

Table III.14-3
ACEC Acres within BLM-Managed Lands in the LUPA Decision Area

Areas of Critical Environmental Concern	Acres
San Sebastian Marsh/San Felipe Creek ACEC	7,000
Singer Geoglyphs ACEC	2,000
West Mesa ACEC	19,000
Yuha Basin ACEC	66,000
Kingston and Funeral Mountains (All within CDCA)	
Amargosa North ACEC	7,000
Amargosa South ACEC	17,000
Clark Mountains ACEC	4,000
Halloran Wash ACEC	2,000
Kingston Range ACEC	19,000
Mesquite Lake ACEC	7,000
Mountain Pass Dinosaur Trackway ACEC	600
Mojave and Silurian Valley	
Afton Canyon ACEC	9,000
Amargosa South ACEC (occurs in 2 ecoregion subareas)	2,000
Bedrock Spring ACEC	800
Black Mountain ACEC (occurs in 2 ecoregion subareas)	37,000
Calico Early Man Site ACEC	800
Christmas Canyon ACEC (occurs in 2 ecoregion subareas)	1,000
Coolgardie Mesa ACEC	10,000
Cronese Basin ACEC	8,500
Denning Springs ACEC	400
Manix Paleontological ACEC (occurs in 2 ecoregion subareas)	2,000
Mesquite Hills/Crucero ACEC	5,000
Mojave Fringe-toed Lizard ACEC (occurs in 3 ecoregion subareas)	7,000
Brisbane Valley Mojave Monkeyflower ACEC (occurs in 3 ecoregion subareas)	14,000
Parish's Phacelia ACEC	42,000
Rainbow Basin/Owl Canyon ACEC (occurs in 2 ecoregion subareas)	4,000
Red Mountain Spring ACEC	700
Salt Creek Hills ACEC	2,000
Steam Well ACEC	Less than 100
West Paradise ACEC	200
Western Rand Mountains ACEC (occurs in 2 ecoregion subareas)	200
Owens River Valley	
Fossil Falls ACEC	Less than 100
Rose Springs ACEC	800

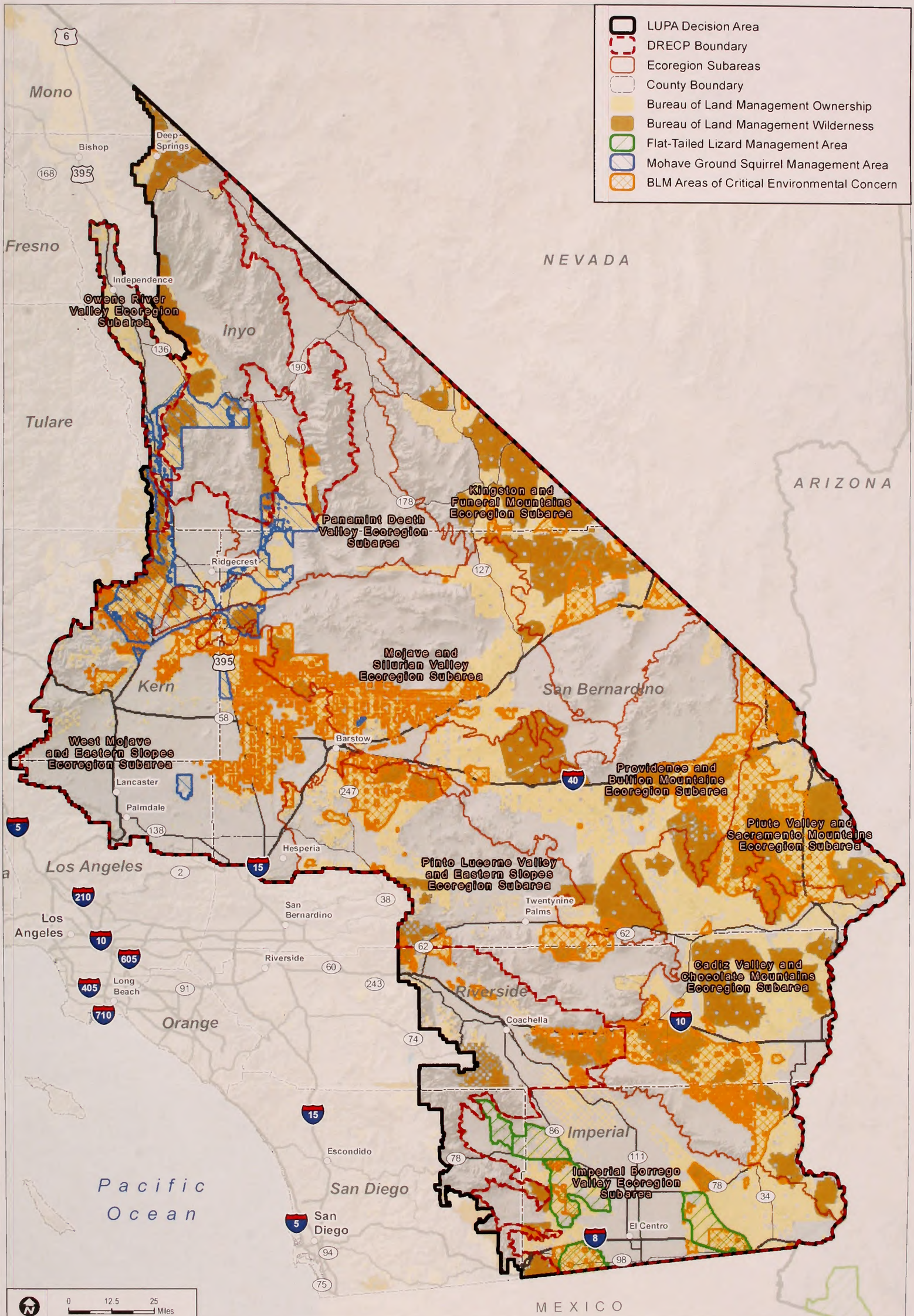
Table III.14-3
ACEC Acres within BLM-Managed Lands in the LUPA Decision Area

Areas of Critical Environmental Concern	Acres
Panamint Death Valley	
Christmas Canyon ACEC (occurs in 2 ecoregion subareas)	2,000
Great Falls Basin Argus Range ACEC	1,000
Last Chance Canyon ACEC (occurs in 2 ecoregion subareas)	4,000
Trona Pinnacles ACEC	4,000
Warm Sulfur Spring ACEC	300
Pinto Lucerne Valley and Eastern Slopes	
Bendire's Thrasher ACEC (occurs in 2 ecoregion subareas)	10,000
Big Morongo Canyon ACEC	12,000
Carbonate Endemic Plants Research Natural Area (RNA) ACEC	4,000
Juniper Flats ACEC	2,000
Mojave Fishhook Cactus ACEC (occurs in 2 ecoregion subareas)	300
Mojave Fringe-toed Lizard ACEC (occurs in 3 ecoregion subareas)	Less than 100
Brisbane Valley Mojave Monkeyflower ACEC (occurs in 3 ecoregion subareas)	17,000
Rodman Mountains Cultural Area ACEC	6,000
Soggy Dry Lake Creosote Rings ACEC	200
Upper Johnson Valley Yucca Rings ACEC	300
Whitewater Canyon ACEC	3,000
Piute Valley and Sacramento Mountains	
Bigelow Cholla RNA ACEC	100
Dead Mountains ACEC	27,000
Mopah Spring ACEC (occurs in 2 ecoregion subareas)	2,000
Turtle Mountains NNL ACEC (occurs in 2 ecoregion subareas)	42,000
Whipple Mountains ACEC (occurs in 2 ecoregion subareas)	2,000
Providence and Bullion Mountains	
Amboy Crater NNL ACEC	600
Manix Paleontological ACEC (occurs in 2 ecoregion subareas)	1,000
Marble Mountain Fossil Bed ACEC	200
Mojave Fringe-toed Lizard ACEC (occurs in 3 ecoregion subareas)	15,000
Pisgah RNA ACEC	18,000
West Mojave and Eastern Slopes	
Barstow Woolly Sunflower ACEC	18,000
Bendire's Thrasher ACEC (occurs in 2 ecoregion subareas)	2,000
Black Mountain ACEC (occurs in 2 ecoregion subareas)	14,000
Desert Tortoise RNA ACEC	22,000
Harper Dry Lake ACEC	500

Table III.14-3
ACEC Acres within BLM-Managed Lands in the LUPA Decision Area

Areas of Critical Environmental Concern	Acres
Jawbone-Butterbredt ACEC	146,000
Kelso Creek Monkeyflower ACEC	2,000
Last Chance Canyon ACEC (occurs in 2 ecoregion subareas)	1,000
Middle Knob ACEC	18,000
Mojave Fishhook Cactus ACEC (occurs in 2 ecoregion subareas)	300
Brisbane Valley Mojave Monkeyflower ACEC (occurs in 3 ecoregion subareas)	5,000
Rainbow Basin/Owl Canyon ACEC (occurs in 2 ecoregion subareas)	100
Sand Canyon ACEC	2,000
Short Canyon ACEC	800
Western Rand Mountains ACEC (occurs in 2 ecoregion subareas)	31,000
Bakersfield/Caliente RMP	
Horse Canyon ACEC	1,500
CDCA Area outside the DRECP boundary	
Big Morongo Canyon ACEC	12,000
Cerro Gordo ACEC	9,000
Coyote Mountains Fossil Site ACEC	5,000
Dos Palmas ACEC	8,000
Fossil Falls ACEC	2,000
Great Falls Basin ACEC	9,000
Jawbone-Butterbredt ACEC	146,000
Saline Valley ACEC	1,000
Sand Canyon ACEC	1,000
Surprise Canyon ACEC	5,000
White Mountain City ACEC	1,000
Whitewater Canyon ACEC	11,000
Yuha Basin ACEC	1,000

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.
Source: BLM 2015



Sources: ESRI (2014); BLM (2015); RECON (2015)

FIGURE III.14-4

ACECs and Wildlife Management Areas on BLM-managed Lands within the LUPA Decision Area

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III.14.2.2.2 Wildlife Management Areas

BLM established DWMAs to protect high-quality habitat for the threatened Mojave population of the desert tortoise. The majority of DWMAs overlap with Mojave desert tortoise-designated critical habitat. Eight DWMAs are in the LUPA Decision Area (Table III.14-4).

Table III.14-4
Wildlife Management Area Acres within
BLM-administered Lands in the LUPA Decision Area

Wildlife Management Areas	Total Acres
Cadiz Valley and Chocolate Mountains	
Chemehuevi DWMA (occurs in 3 ecoregion subareas)	158,000
Chuckwalla DWMA (occurs in 3 ecoregion subareas)	431,000
Imperial Borrego Valley	
Flat-tailed Horned Lizard Management Area (there is overlap with ACEC acres)	*265,000*
Chuckwalla DWMA (occurs in 3 ecoregion subareas)	400
Kingston and Funeral Mountains	
Ivanpah DWMA	35,000
Shadow Valley DWMA	96,000
Mojave and Silurian Valley	
Mohave Ground Squirrel Wildlife HMA (there is overlap with ACEC acres)	*262,000*
Fremont-Kramer DWMA (occurs in 2 ecoregion subareas)	29,000
Ord-Rodman DWMA (occurs in 4 ecoregion subareas)	37,000
Superior-Cronese DWMA (occurs in 2 ecoregion subareas)	306,000
Owens River Valley	
Mohave Ground Squirrel Wildlife HMA (there is overlap with ACEC acres)	*59,000*
Panamint Death Valley	
Mohave Ground Squirrel Wildlife HMA (there is overlap with ACEC acres)	*187,000*
Pinto Lucerne Valley and Eastern Slopes	
Chuckwalla DWMA (occurs in 3 ecoregion subareas)	500
Ord-Rodman DWMA (occurs in 4 ecoregion subareas)	178,000
Pinto Mountains DWMA (occurs in 2 ecoregion subareas)	101,000
Piute Valley and Sacramento Mountains	
Chemehuevi DWMA (occurs in 3 ecoregion subareas)	402,000
Piute-Fenner DWMA (occurs in 2 ecoregion subareas)	87,000
Providence and Bullion Mountains	
Chemehuevi DWMA (occurs in 3 ecoregion subareas)	262,000
Ord-Rodman DWMA (occurs in 4 ecoregion subareas)	1,000
Pinto Mountains DWMA (occurs in 2 ecoregion subareas)	9,000
Piute-Fenner DWMA (occurs in 2 ecoregion subareas)	66,000
West Mojave and Eastern Slopes	
Mohave Ground Squirrel Wildlife HMA (there is overlap with ACEC acres)	*629,000*

Table III.14-4
Wildlife Management Area Acres within BLM-administered Lands in the LUPA Decision Area

Wildlife Management Areas	Total Acres
Fremont-Kramer DWMA (occurs in 2 ecoregion subareas)	284,000
Ord-Rodman DWMA (occurs in 4 ecoregion subareas)	4,000
Superior-Cronese DWMA (occurs in 2 ecoregion subareas)	101,000
CDCA Area outside the DRECP boundary	
Mohave Ground Squirrel Wildlife HMA (may overlap with ACECs)	*193,300*
Chuckwalla DWMA	63,500
Coachella Valley Fringe-toed Lizard	10,000

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.
Source: BLM 2015

Special Management Areas are designated for management of specific species that are considered at risk of being listed under the Endangered Species Act. These areas have special management prescriptions that may limit surface disturbance activities in designated areas. There are two Special Management Areas in the LUPA Decision Area, the Mohave Ground Squirrel Conservation Area and Flat-tailed Horned Lizard Management Area. These areas are described in more detail later in this chapter (see Table III.14-4).Through amendment to the CDCA Plan, BLM has established the Mohave Ground Squirrel Wildlife HMA (West Mojave Plan Record of Decision 2006). BLM has also amended the CDCA Plan to adopt the Flat-tailed Horned Lizard Rangewide Management Strategy, which includes five management areas (Flat-tailed Horned Lizard Interagency Coordinating Committee 2003). BLM has evaluated these areas and is considering designating them as ACECs through the Proposed LUPA. Throughout this document, these areas are included in the ACEC sections; however, they are not currently ACECs.

The Mohave Ground Squirrel Wildlife HMA consists of 1,135,743 acres (overlapping some existing ACECs) and the Flat-tailed Horned Lizard Management Area consists of approximately 264,800 acres (overlapping with existing ACECs), as shown in Figure III.14-4.

For the more than 50 renewable energy projects recently completed or under construction in the LUPA Decision Area included in the baseline, wildlife management areas have been assessed under each project's environmental analysis.

III.14.2.3 Lands with Inventoried Wilderness Characteristics

Although the wilderness review process pertaining to Section 603 of FLPMA has been completed, Sections 201 and 202 of FLPMA direct BLM to prepare and maintain, on a continuing basis, an inventory of all public lands and their resources and other values. The BLM is also directed, when appropriate, to revise land use plans. This includes an inventory of lands with wilderness characteristics outside the areas designated as WSAs, and units of the National Wilderness Preservation System. BLM describes such inventoried lands as lands with wilderness characteristics, shares this information with the public, and integrates this information into its land management decisions.

Lands outside designated wilderness or WSAs are inventoried during the land use planning process under the authority of Section 201 of FLPMA to determine if the lands possess wilderness characteristics. To be classified as lands with wilderness characteristics, they must possess sufficient size, naturalness, and outstanding opportunities for either solitude or primitive and unconfined recreation. The BLM may also identify one or more alternatives to protect identified lands with wilderness characteristics unless BLM determines that impairment of wilderness characteristics is appropriate and consistent with applicable requirements of law and other resource management considerations (BLM Land Use Planning Handbook, H 1601-1, Appendix C, subparagraph K, Wilderness Characteristics; BLM Manual 6310). Lands identified for protection of their wilderness characteristics through the land use planning process do not become wilderness or WSAs. Only Congress can designate wilderness areas.

The BLM completed a wilderness characteristics inventory for those lands that could potentially be impacted in Development Focus Areas under the Proposed LUPA. Table III.14-5 and Figure III.14-5 show the results of this inventory. Approximately 1,213,000 acres of inventoried lands were found to have wilderness characteristics within BLM-administered lands in the LUPA Decision Area (see Table III.14-5). The Imperial Sand Dunes Record of Decision identifies approximately 42,000 acres as possessing wilderness characteristics and includes management actions to protect those characteristics (see Table III.14-5).

In addition, the BLM has received citizen's wilderness characteristics inventories. Of the approximately 700,000 acres remaining to be inventoried for wilderness characteristics in the LUPA Decision Area, the BLM has identified approximately 403,000 acres as having the best potential for lands with wilderness characteristics. Of these acres believed to have the best potential for wilderness characteristics, more than 300,000 acres have been previously surveyed by citizen organizations and have been identified as having wilderness characteristics. These acres have the highest priority for inventorying by the BLM.

Table III.14-5
BLM Lands Inventoried for
Wilderness Characteristics in the LUPA Decision Area

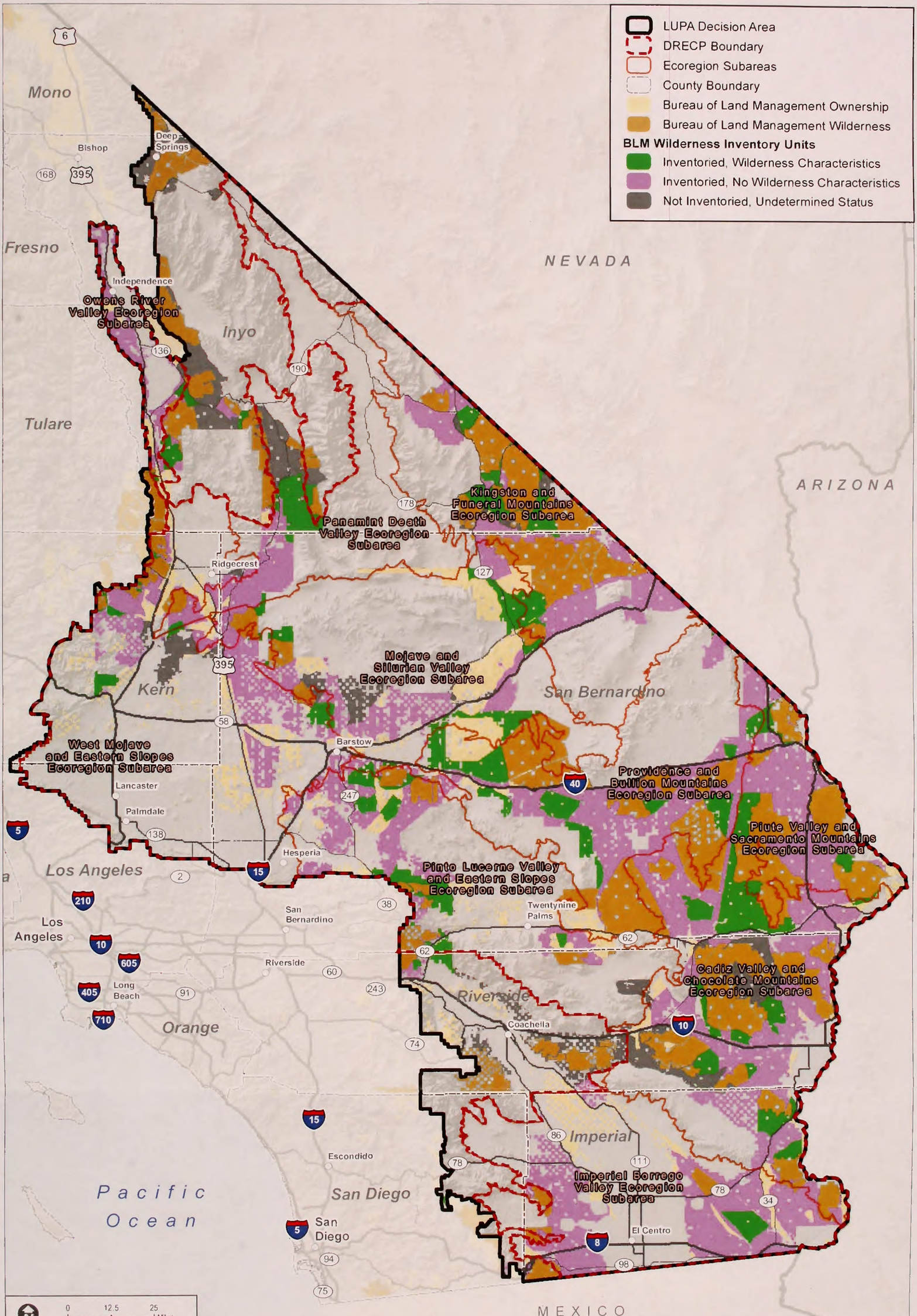
Ecoregion Subarea	Inventoried, Found to Have Wilderness Characteristics	Inventoried, No Wilderness Characteristics Found
Cadiz Valley and Chocolate Mountains	279,000	848,000
Imperial Borrego Valley (Imperial Sand Dunes, managed)	42,000	639,000
Kingston and Funeral Mountains	139,000	373,000
Mojave and Silurian Valley	126,000	302,000
Owens River Valley	9,000	116,000
Panamint Death Valley	91,000	197,000
Pinto Lucerne Valley and Eastern Slopes	120,000	295,000
Piute Valley and Sacramento Mountains	74,000	425,000
Providence and Bullion Mountains	229,000	503,000
West Mojave and Eastern Slopes	46,000	344,000
CDCA Area outside the DRECP boundary	58,000	49,000
Total	**1,213,000**	**4,093,000**

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.
Source: BLM 2015

For the more than 50 renewable energy projects recently completed or under construction within the LUPA Decision Area included in the baseline, lands have been inventoried for wilderness characteristics and have been assessed under each project's environmental analysis, where appropriate. For example, the Alta East Wind project is near lands inventoried and found to have wilderness characteristics in the West Mojave and Eastern Slopes ecoregion subarea.

III.14.2.4 Special Recreation Management Areas

SRMAs are units of public land identified for the purpose of directing available recreation funding and personnel to fulfill commitments made to provide specific, structured recreation opportunities. SRMAs are managed to protect and enhance a targeted set of activities, experiences, benefits, and desired recreation characteristics. Three designated SRMAs are in the LUPA Decision Area boundary—Alabama Hills, Meccacopia, and Imperial Sand Dunes. Table III.14-6 shows the SRMA acres by ecoregion subarea. See Section III.18.2.1.1, Recreation Management Areas, for more information on SRMAs.



Sources: ESRI (2014), BLM (2015), RECON (2015)

FIGURE III.14-5

Lands with Wilderness Characteristics Inventoried by BLM within the LUPA Decision Area

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Table III.14-6
Special Recreation Management Area within
BLM-managed Lands in the LUPA Decision Area

Special Recreation Management Area	Total Acres
Imperial Borrego Valley	
Imperial Sand Dunes SRMA	164,000
Owens River Valley	
Bishop Field Office – Alabama Hills SRMA	29,000
CDCA Area outside the DRECP boundary	
Meccacopia SRMA	94,000
Total	**287,000**

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.
Source: BLM 2013

For the more than 50 renewable energy projects recently completed or under construction within the LUPA Decision Area included in the baseline, SRMAs have been assessed under each projects environmental analysis where appropriate. None of the projects are in SRMAs.

III.14.2.5 Designated Open Off-highway Vehicle Areas

Off-highway Vehicle Areas are BLM-managed lands made available for off-highway vehicle recreation. All public land in the LUPA Decision Area is designated as open, closed, or limited for motorized vehicle use. On lands designated as open, motorized vehicles may be operated anywhere a vehicle can go within the boundaries of the open area. See the Outdoor Recreation Section III.18.2.1.2 for more information.

III.14.2.6 Multiple-use Classes

Within the LUPA Decision Area, BLM manages approximately 9,929,000 acres for multiple use and sustained yield, pursuant to FLPMA, the CDCA Plan, and the Bishop and Bakersfield RMPs. Multiple-use classes in the CDCA Plan that are also contained within the LUPA Decision Area are described below. The Bakersfield and Bishop RMPs do not contain multiple-use classes.

The Proposed LUPA multiple-use classes are detailed in Table III.14-7, and also shown in Appendix R1 (Figures R1.14-1 through R1.14-11a and R1.14-11b).

Table III.14-7
Multiple-use Class Acres within BLM-managed Lands in the LUPA Decision Area by Ecoregion Subarea

Ecoregion Subarea	Class C	Class L	Class M	Class I	Unclassified
Cadiz Valley and Chocolate Mountains	744,000	629,000	764,000	19,000	2,000
Imperial Borrego	54,000	502,000	166,000	85,000	38,000
Kingston and Funeral Mountains	612,000	349,000	214,000	9,000	4,000
Mojave and Silurian Valley	166,000	454,000	332,000	40,000	11,000
Owens River Valley	9,000	50,000	9,000	400	3,000
Panamint Death Valley	34,000	281,000	40,000	93,000	6,000
Pinto Lucerne Valley and Eastern Slopes	128,000	231,000	223,000	225,000	75,000
Piute Valley and Sacramento Mountains	395,000	361,000	136,000	0	7,000
Providence and Bullion Mountains	549,000	513,000	307,000	36,000	14,000
West Mojave and Eastern Slopes	80,000	548,000	94,000	47,000	85,000
CDCA Area outside the DRECP boundary	580,700	322,300	96,400	5,500	49,500
Total	**3,351,700**	**4,240,300**	**2,381,400**	**559,900**	**294,500**

See "California Desert Conservation Area Plan" in Section III.14.1 for descriptions of the four multiple-use classes.
Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.
Source: BLM 2015

Of the five renewable energy projects recently completed or under construction on BLM-administered land within the LUPA Decision Area, the Ivanpah Solar Electric Generating System is on land managed as Class L and Class M, Ocotillo Express Wind is on unclassified land, Alta East Wind is on land managed as Class M and unclassified, and the Genesis NextEra and Desert Sunlight Solar Farm are on land managed as Class M.

III.14.3 Transmission Outside the DRECP Area

The transmission corridors outside the DRECP area include four geographic areas: San Diego, Los Angeles, North Palm Springs–Riverside, and the Central Valley. The setting includes BLM designations, classifications, allocations, and wilderness areas within 1.5 miles of the center of transmission corridors, a 3-mile-wide swath.

III.14.3.1 National Conservation Lands

III.14.3.1.1 National Conservation Lands Identified Under Public Law 111-11

The transmission line corridors outside the DRECP area are not within the boundaries of the CDCA. Therefore, the corridors would not traverse the National Conservation Lands under PL 111-11.

III.14.3.1.2 Wilderness Areas

Table III.14-8 lists the wilderness areas within a 3-mile-wide swath of the transmission line corridors, and includes the distance from the closest boundary of the wilderness area. This table applies to all of the alternatives, except Alternative 2. Under Alternative 2, in addition to the wilderness areas in Table III.14-8, one additional transmission line corridor would be within 0.5 mile of the San Gorgonio Wilderness Area in the North Palm Springs–Riverside area. Transmission line construction is prohibited in designated wilderness, even within existing transmission corridors.

Table III.14-8
Designated Wilderness Areas Outside the DRECP Area

Wilderness Area	Distance From Corridor (in miles)
San Diego Area	
Jacumba	0.2
Carrizo Gorge	0.7
Hauser	0.8
Pine Creek	1.2
Los Angeles Area	
San Gabriel	0.5
North Palm Springs–Riverside Area	
Mecca Hills	Wilderness Area crossed by corridor for 10.6 miles
Joshua Tree	0.4
Orocopia Mountains	0.6
Cucamonga	1.5
San Jacinto	1.5

A portion of this wilderness area also is within the DRECP area
Source: BLM 2013

III.14.3.1.3 National Monuments

The Santa Rosa and San Jacinto Mountains National Monument is 0.2 mile from the North Palm Springs–Riverside area transmission corridor. There are no national monuments near the San Diego, Los Angeles, and Central Valley areas.

III.14.3.1.4 Wild and Scenic Rivers

There are no designated National Wild and Scenic Rivers in the vicinity of the San Diego, Los Angeles, North Palm Springs–Riverside, or Central Valley areas.

III.14.3.1.5 National Scenic and Historic Trails

NSHTs in the LUPA Decision Area include the Pacific Crest National Scenic Trail, the Juan Bautista de Anza National Historic Trail, and the Old Spanish National Historic Trail (see Figure III.14-1).

Pacific Crest National Scenic Trail

Transmission line corridors would intersect the Pacific Crest National Scenic Trail in the San Diego, Los Angeles, and North Palm Springs–Riverside areas.

Juan Bautista de Anza National Historic Trail

Transmission line corridors would intersect the Juan Bautista de Anza National Historic Trail in the Los Angeles and North Palm Springs–Riverside areas.

Old Spanish National Historic Trail

Transmission line corridors would intersect the Old Spanish National Historic Trail in the Los Angeles and North Palm Springs–Riverside areas.

III.14.3.1.6 Wilderness Study Areas

Table III.14-9 identifies WSAs near corridors in the San Diego and Central Valley areas. No WSAs are within the 3-mile-wide swath of transmission lines in the Los Angeles and North Palm Springs–Riverside area transmission corridors.

Table III.14-9
Wilderness Study Areas Outside the DRECP Area

Wilderness Study Area	Distance From Corridor (miles)
San Diego Area	
Hauser Mountain	0.2
Carrizo Gorge	1.2
Central Valley Area	
Panoche Hills North	0.4
Panoche Hills South	0.5

Source: BLM 2008

III.14.3.2 Areas of Critical Environmental Concern

Table III.14-10 applies to the ACECs within the 3-mile-wide swath of all outside-of-area transmission line corridors. The actual area traversed would depend on the alternative implemented. No ACECs are in the vicinity of the transmission line corridors in the Los Angeles area.

Table III.14-10
ACECs Outside the DRECP Area

Area of Critical Environmental Concern	Distance From Corridor (miles)
San Diego Area	
In-Ko-Pah Mountains	Corridor would be adjacent to the western edge of the ACEC
Table Mountain	0.5
North Palm Springs–Riverside Area	
Big Morongo Canyon	Traversed by approximately 3 miles of the corridor
Coachella Valley Fringe-toed Lizard	Intermittently traversed by up to approximately 18 miles of the corridor
Dos Palmas	Traversed by up to approximately 12 miles of the corridor
Chuckwalla Desert Wildlife Management Area	Intermittently traversed by approximately 17 miles of the corridor
Potrero	Traversed by approximately 1.5 miles of the corridor
Whitewater Canyon	0.2
Central Valley Area	
Panoche/Coalinga	Intermittently traversed by approximately 30 miles of the corridor
Kettleman Hills	0.6
Alkali Sinks	0.8

Source: BLM 2013

III.14.3.3 Lands with Wilderness Characteristics

No lands within any of the outside the DRECP area transmission corridors have wilderness characteristics. All corridors have existing transmission lines.

III.14.3.4 CDCA Plan Multiple-use Classes

The transmission line corridors in the Los Angeles and Central Valley areas would be completely out of the CDCA Plan boundaries and would not traverse land under BLM multiple-use classifications. Portions of the San Diego and North Palm Springs–Riverside areas include lands in the CDCA Plan. Table III.14-11 identifies the miles of transmission line corridors that would traverse each multiple-use classification.

Table III.14-11
Multiple-use Classes Outside the DRECP Area

Multiple-use Classes	Miles Traversed by Corridor(s)
San Diego Area	
Class L	6.3
North Palm Springs–Riverside Area	
Unclassified	Up to 121.7
Class L	Up to 37
Class M	Up to 27.8
Class C	10

Table value assumes all corridors are used.
Source: BLM 2013

III.15 MINERAL RESOURCES

This chapter provides a brief history of federal mineral resource development and explains how regulations governing that development impact the Desert Renewable Energy Conservation Plan (DRECP) Bureau of Land Management (BLM) Land Use Plan Amendment (LUPA). Minerals in the LUPA Decision Area include geothermal resources, high-value resource mining such as gold and rare earth minerals, aggregate, sand and gravel, and oil and gas.

III.15.1 Statutory, Regulatory, and Policy Setting

Minerals management on public lands falls into three categories: locatable, leasable, and mineral materials (previously salable minerals). Federal laws, regulations, and guidance for mineral resources and mining are explained in the following paragraphs.

III.15.1.1 General Mining Law of 1872 (30 United States Code [U.S.C.] 21 et seq.)

The General Mining Law, as amended, grants citizens (and those seeking citizenship) of the United States the right to enter public lands and reserve interests for the exploration and development of minerals, subject to this mining law. The law specifically includes minerals such as gold, silver, copper, lead, zinc, and uranium; nonmetallic minerals such as asbestos, barite, gypsum, and mica; and uncommon varieties of stone (43 Code of Federal Regulations [CFR] 3800).

This law sets forth rules and procedures for the exploration, location, and patenting of lode, placer, and mill site mining claims. Claimants must file notice of the original claim with the BLM, as well as either an annual notice of the intention to hold, an affidavit of assessment work, or a similar notice.

III.15.1.2 Stock Raising Homestead Act of 1916 (43 U.S.C. 291-299)

Patents issued under the Stock Raising Homestead Act reserved minerals to the United States and granted the right to prospect, mine, and remove specified minerals. Certain conditions exist to protect the patent applicant's improvements.

III.15.1.3 Mineral Leasing Act of 1920 (30 U.S.C. 181 et seq.)

The Mineral Leasing Act authorizes and governs the leasing of public lands to develop deposits of coal, oil, gas, and other hydrocarbons, sulfur, phosphate, potassium, and sodium. The BLM issues right-of-way grants for oil and natural gas gathering, distribution pipelines, and related facilities, as well as oil and natural gas transmission pipelines and related facilities (43 CFR Part 2880, and Subchapter C).

III.15.1.4 Materials Sales Act of 1947 (30 U.S.C. 601–604)

The Materials Sales Act provides for materials disposal on public lands. The Secretary of the Department of the Interior (DOI) is authorized to develop and implement rules and regulations to dispose of mineral materials (including, but not limited to, common varieties of sand, stone, gravel, pumice, pumicite, cinders, and clay) and vegetative materials (including, but not limited to, yucca, manzanita, mesquite, cactus, and timber or other forest products) on public lands in the United States. These materials can be disposed of upon adequate payment to the DOI. The Secretary of the Interior has the authority and discretion to permit any federal, state, or territorial agency, unit, or subdivision, including municipalities, or any other association or corporation not organized for profit, to take and remove, without charge, materials and resources for uses other than commercial or industrial purposes or resale (43 CFR 3600).

III.15.1.5 Mineral Leasing Act for Acquired Lands of 1947 (30 U.S.C. 351 et seq.)

The Mineral Leasing Act for Acquired Lands broadens provisions of the Mineral Leasing Act and the authority of the Secretary of the Interior to include oil and gas operations on federal lands.

III.15.1.6 Geothermal Steam Act of 1970 (30 U.S.C. 1001 et seq.), and Amendments

The Geothermal Steam Act authorizes and governs the lease and development of geothermal steam and related resources on either certain federally managed lands or on lands where a geothermal resource was reserved to the United States (43 CFR 3200).

III.15.1.7 Mining and Mineral Policy Act of 1970 (30 U.S.C. 21[a])

The Mining and Mineral Policy Act fosters and encourages the private development of economically sound and stable domestic mining and mineral, metal, and mineral reclamation industries. The law also fosters the orderly and economic development of domestic mineral resources, reserves, and the reclamation of metals and minerals to satisfy industrial, security, environmental, mining, mineral, and metallurgical research, including the use and recycling of scrap to promote the efficient use of natural and reclaimable mineral resources. The law further promotes the study and development of methods for the disposal, control, and reclamation of mineral waste products, as well as the reclamation of mined lands to lessen the environmental impacts of mining's many aspects and activities.

III.15.1.8 Surface Mining Control and Reclamation Act of 1977 (30 U.S.C. 1201 et seq.)

The Surface Mining Control and Reclamation Act establishes a program for the regulation of surface mining activities under the administration of DOI's Office of Surface Mining, Reclamation, and Enforcement.

The law sets forth minimum uniform requirements for all mining on federal lands, including both the exploration for resources and the reclamation of mined lands to mitigate the many aboveground effects from mining. Mine operators are required to minimize disturbances and adverse impacts on fish, wildlife, and other elements of the natural environment and to enhance these resources where practical. Restoring land and water resources is a priority in the reclamation planning process.

III.15.1.9 Bureau of Land Management Manual 3031—Energy and Mineral Resource Assessment

The BLM's classification system determines the potential, or likelihood, of accumulated mineral resources in a given area. The *BLM Manual 3031—Energy and Mineral Resource Assessment* outlines BLM's mineral potential classification system, which includes the following levels:

- **Zero:** The geologic environment, the inferred geologic processes, and the lack of mineral occurrences do not indicate potential for accumulation of mineral resources.
- **Low:** The geologic environment and the inferred geologic processes indicate a low potential for accumulation of mineral resources. BLM no longer evaluates low-level potential.
- **Moderate:** The geologic environment, the inferred geologic processes, and the reported mineral occurrences or valid geochemical/geophysical anomalies indicate moderate potential for accumulation of mineral resources.
- **High:** The geologic environment, the inferred geologic processes, the reported mineral occurrences and/or valid geochemical/geophysical anomalies, and the known mines or deposits indicate high potential for accumulation of mineral resources. The "known mines and deposits" do not have to be within the area classified, but have to be within the same type of geologic environment.
- **Not Determined:** Mineral potential is not determined because of a lack of useful data. This notation does not require a level-of-certainty qualifier. This level is seldom used; when used, it is for a specific commodity only.

Levels of certainty are described below:

1. The available data are insufficient and/or cannot be considered as direct or indirect evidence to support or refute the possible existence of mineral resources within the respective area.
2. The available data provide indirect evidence to support or refute the possible existence of mineral resources.
3. The available data provide direct evidence, but are quantitatively minimal to support or refute the possible existence of mineral resources.
4. The available data provide abundant direct and indirect evidence to support or refute the possible existence of mineral resources.

III.15.1.10 Bureau of Land Management Minerals Guidance

Surface management under 43 CFR Subpart 3809 has two primary purposes:

a. Prevent unnecessary or undue degradation of public lands by operations authorized by the mining laws. Anyone intending to develop mineral resources on public lands must prevent unnecessary or undue degradation of the land and reclaim disturbed areas. This subpart establishes procedures and standards to ensure that operators and mining claimants meet this responsibility.

b. Provide for maximum possible coordination with appropriate state agencies to avoid duplication and ensure that operators prevent unnecessary or undue degradation of public lands.

Under subsection 3809.10, BLM also classifies mining operation use:

- Casual use: For which an operator does not need to notify BLM. The operator must reclaim any casual use disturbance. If operations do not qualify as casual use, an operator must submit a notice or plan of operations.
- Notice-level operations: For which operators conducting mineral exploration activities disturbing less than 5 acres and/or excavating less than 1,000 tons of material must submit a notice (except for certain suction dredging operations covered by subsection 3809.31[b]).
- Plan-level operations: For which an operator conducting mining operations, large exploration operations or mining related activities within certain special-status lands must both submit a plan of operations and obtain BLM approval.

The BLM categorizes minerals as locatable, leasable, or mineral materials. Each classification is administered differently, each category having unique regulatory requirements for administration for acquisition, exploration, and development. Definitions for locatable, leasable, and mineral materials appear below:

Locatable Minerals. Locatable minerals include metallic minerals such as gold, silver, copper, lead, zinc, and uranium; nonmetallic minerals such as alunite, asbestos, barite, bentonite, gypsum, geodes/gem minerals, mica, and zeolite mica; and uncommon varieties of stone (43 CFR 3800). The BLM policy and guidance for locatable minerals includes *BLM Manual 3800—Mining Claims Under the General Mining Laws* and *BLM Handbook H-3042-1—Solid Minerals Reclamation Handbook.*

Section 302 of the Federal Land Policy and Management Act of 1976 recognizes the rights of locators to claims filed under the Mining Law of 1872, including the right of ingress and egress. This section also requires the Secretary of the Interior to take any action, through regulation or otherwise, to prevent unnecessary or undue degradation of public lands (43 U.S.C. 1732). The regulations contained in 43 CFR 3715, 43 CFR 3802, and 43 CFR 3809 balance these two mandates by requiring management of the surface disturbances caused by mineral exploration development and reclamation, including mining claim use and occupancy. Appropriation of a mineral deposit is made by the location of a mining claim. A mining claimant's rights under the mining laws are subject to, and validated by, a discovery of a valuable mineral deposit that has been made within the boundaries of the mining claim.

Exploration and development must both obey all applicable federal and state laws, regulations, and policies and be conducted within applicable approved land use plans. Restrictions and stipulations may apply to a proposed activity, based on review and analysis by the authorized officer.

Leasable Minerals. These minerals include fluid minerals such as oil, gas, coalbed methane, carbon dioxide, and geothermal resources, as well as solid minerals such as coal, sodium, and potash. Although not a leasable mineral, helium is included in this category because it is typically associated with carbon dioxide exploration and development (43 CFR 3100 and 43 CFR 3200). The BLM policy and guidance for leasable minerals includes *BLM Manual Series 3100 Onshore Oil and Gas Leasing* and all associated handbooks, instruction memoranda, and orders.

Geothermal resources are renewable energy fluid minerals. The required BLM lease to develop them grants the right to access and develop within lease area boundaries and in accordance with the lease terms and applicable federal, state, and local laws, regulations, and ordinances. The lease also requires, unless otherwise stipulated, the commitment to allow surface land

use under standard terms and conditions. In assessing lease restrictions, BLM mandates the least restrictive available constraint in meeting resource protection objectives.

For split estate minerals (where the United States owns the minerals but not the land surface), leasing is authorized in accordance with federal law, regulations, and policy guidance. Land surface owners are notified of applications and given the opportunity to comment before leases are issued.

Mineral Materials. Mineral materials include construction materials such as sand, gravel, cinders, decorative rock, and building stone (43 CFR 3600). The BLM policy and guidance for mineral materials includes *BLM Handbook H-3242-1, Solid Minerals Reclamation Handbook* and *BLM Manual and Handbook 3600*.

Removal of mineral materials from BLM-administered lands requires either a sales contract or a free use permit. Disposal of mineral materials is discretionary and authorized in accordance with an approved land use plan and appropriate laws, regulations, and ordinances. The BLM's policy is to make mineral materials available to the public and local governmental agencies whenever possible and wherever environmentally acceptable. Mineral materials may not be developed on public lands if the development is not in the public interest or would unnecessarily degrade public lands or resources.

III.15.1.11 Memorandum of Understanding Between the Department of the Interior (Bureau of Land Management), Department of Agriculture (U.S. Forest Service), and the State of California Department of Conservation and State Mining and Geology Board

The purpose of the Memorandum of Understanding of 1992 (MOU) is to coordinate surface mining and reclamation in accordance with California's Surface Mining and Reclamation Act of 1975, as amended. The MOU ensures (1) the application of adequate and appropriate reclamation throughout the State of California, (2) simplification of the administration of surface mining and reclamation practice requirements on federal lands and on combined federal and private lands, (3) coordination of activities governing reclamation, and (4) elimination of duplication among lead agencies and counties (as defined in the Surface Mining and Reclamation Act, Public Resources Code Section 2728) when implementing state and federal requirements. The MOU acknowledges that the federal government recognizes that the Surface Mining and Reclamation Act applies to public lands in California and that counties act as the "lead agencies" responsible for regulating and protecting mineral resources classified by the State Geologist and the State Mining and Geology Board.

III.15.1.12 Energy Policy Act of 2005

The 2005 Energy Policy Act regulates and promotes traditional energy production as well as newer, more efficient energy technologies and conservation. It contains several provisions to make geothermal energy production on public lands more competitive with other types of energy generation.

III.15.2 Mineral Resources Within the Land Use Plan Amendment Decision Area

III.15.2.1 Geothermal Resources

Geothermal energy is natural heat from the interior of the earth. Sources of geothermal energy include artesian hot springs and wells that tap groundwater or dry rock at elevated temperatures from high-flow gradients in the subsurface. Geothermal resources are classified according to temperature. High-temperature resources are above 302°F (150°C). Moderate-temperature resources are between 194°F and 302°F (90°C and 150°C). Low-temperature resources are below 194°F (90°C). Only resources with temperatures high enough to produce steam have been developed commercially for power generation. Low- and moderate-temperature geothermal water can be used for ground-source heat pumps for applications such as heating buildings, and in industrial processes, greenhouses, aquaculture, and resorts.

Known geothermal resource areas (KGRAs) are areas where knowledge of the geology and supporting information suggest that a geothermal resource exists and warrants additional investment for leasing and exploration. KGRAs in the LUPA Decision Area are shown in Figure III.15-1. The Coso Hot Springs KGRA is in the Owens River Valley ecoregion subarea, in the area managed by the Ridgecrest Field Office. The Randsburg KGRA is in the Mojave and Silurian Valley and West Mojave and Eastern Slopes ecoregion subareas. The majority of KGRAs are in the Imperial Borrego Valley ecoregion subarea, managed by the El Centro field office. Table III.15-1 shows KGRAs, geothermal resource areas, and geothermal lease area acres in the LUPA Decision Area.

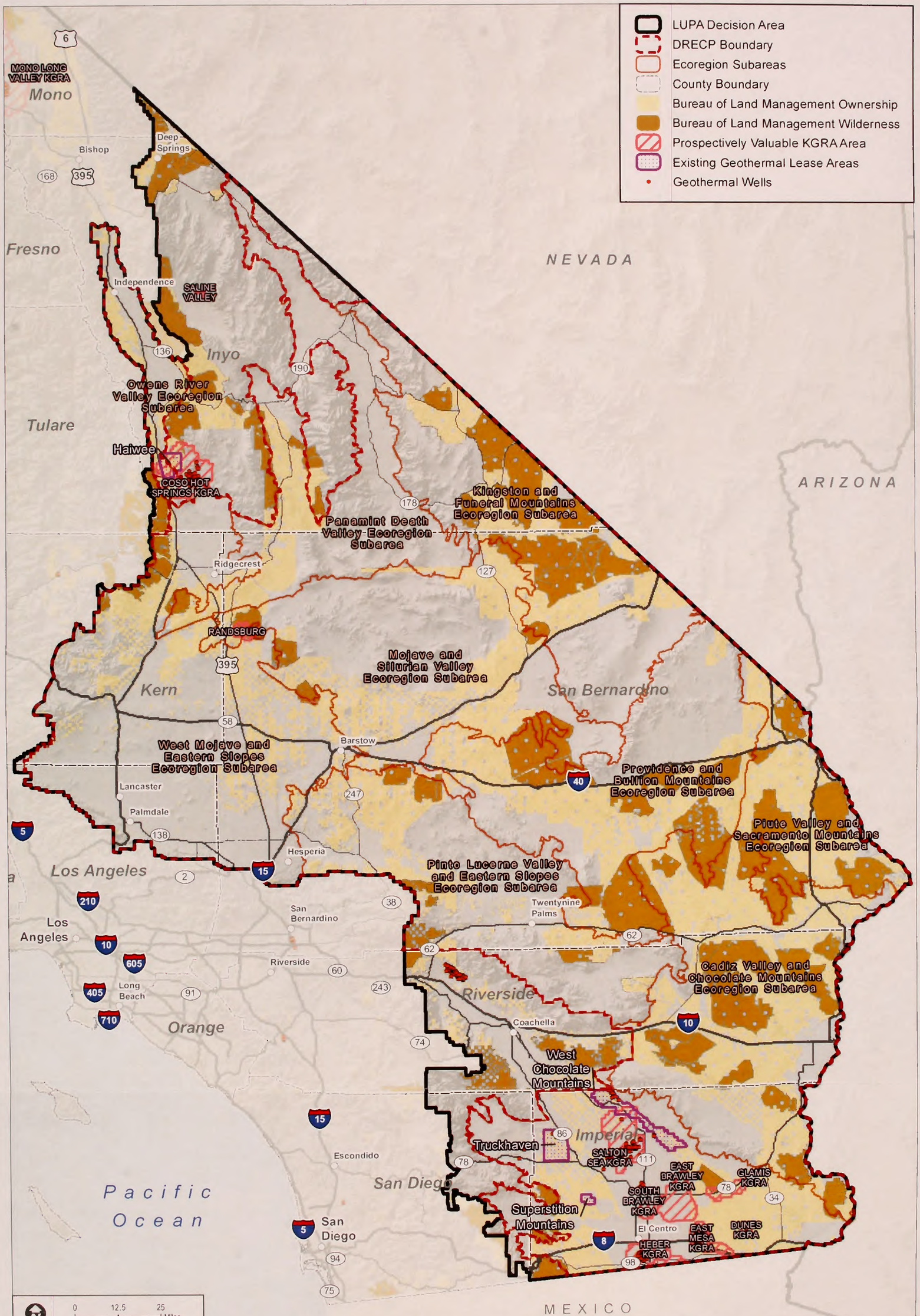
Table III.15-1
Known Geothermal Resource Area and Lease Area
Acres on BLM-Managed Lands in the LUPA Decision Area

KGRA / Lease Area	Acres
Imperial Borrego Valley	
Superstition Mountains Geothermal Lease Resource Area	3,000
Truckhaven Geothermal Lease Area	15,000
West Chocolate Mountains Geothermal Lease Resource Area	22,000

Table III.15-1
Known Geothermal Resource Area and Lease Area Acres on BLM-Managed Lands in the LUPA Decision Area

KGRA / Lease Area	Acres
Dunes KGRA	6,500
East Brawley KGRA	30,000
Glamis KGRA	24,500
Salton Sea KGRA	12,000
Mojave and Silurian Valley	
Randsburg KGRA	7,000
Owens River Valley	
Haiwee Geothermal Lease Area	9,000
Coso Hot Springs KGRA	10,500
West Mojave and Eastern Slopes	
Randsburg Geothermal Area	4,500
California Desert Conservation Area outside the DRECP boundary	
Haiwee Geothermal Lease Area	12,000
Coso Hot Springs KGRA	23,500
Total	**179,500**

Notes: Several geothermal leases in the Truckhaven area were cancelled in late 2013. Acres may not reflect all cancelled leases. The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.
Source: BLM 2015



Sources: ESRI (2014); BLM (2015); RECON (2015)

FIGURE III.15-1

Geothermal Resources within the LUPA Decision Area

DRECP Proposed LUPA and Final EIS

October 2015

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Existing geothermal plants in the KGRAs and surrounding areas appear in Table III.15-2.

Table III.15-2
Geothermal Plants Within the LUPA Decision Area

Geothermal Plants	Megawatt (MW) Production
Coso Hot Springs KGRA – 4 generating plants (on the Naval Air Weapons Station China Lake)	270 MW
Salton Sea KGRA – 10 generating plants (CE Turbo, Elmore, Leathers, Vulcan, Del Ranch, and Salton Sea 1-5) 2 plants under development (Hudson Ranch II and ORNI 18)	327 MW 100 MW
South Brawley KGRA – 1 generating plant (Mesquite)	50 MW
North Brawley – 1 generating plant (North Brawley)	30 MW
Heber KGRA – 3 generating plants (Heber 1 and 2, Heber South)	100 MW
Niland – 2 generating plants (Niland and Hudson Ranch I)	100 MW
East Mesa KGRA – 6 generating plants (GEM Resources II, GEM Resources III, Ormesa I, Ormesa IE, Ormesa IH, and Ormesa II)	75 MW

Notes: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.
Source: California Energy Commission 2013

Geothermal prospects in and surrounding the KGRAs and their likely capacities are listed in Table III.15-3 and shown on Figure III.15-1.

Table III.15-3
Geothermal Prospects Within the LUPA Decision Area

Geothermal Prospect Area	Prospect Likely Capacity
Coso Hot Springs	355 MW
Dunes	11 MW
East Brawley	129 MW
East Mesa	148 MW
Glamis	6 MW
Heber	142 MW
Mesquite/South Brawley	62 MW
Mount Signal	19 MW
Niland	76 MW
North Brawley	135 MW
Randsburg	48 MW

Table III.15-3
Geothermal Prospects Within the LUPA Decision Area

Geothermal Prospect Area	Prospect Likely Capacity
Salton Sea	1,750 MW
Superstition Mountain	10 MW
Truckhaven	25 MW
Westmorland	50 MW

Notes: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.
Source: California Energy Commission 2013

III.15.2.2 High-Potential Mineral Areas

High-potential mineral areas are lands with existing and/or historic mining activity and a reasonable probability of future mineral resource development. Within the LUPA Decision Area, specific geographic areas have been defined as areas with the potential for recoverable high-priority and high-potential mineral resources, including rare earth element areas, as identified in BLM's California Geology, Energy, and Mineral Resource Geographic Information System (GIS) Data (2013). The acreage of high-potential mineral development is shown in Table III.15-4. High-potential mineral areas are also shown for each ecoregion subarea and for the California Desert Conservation Area (CDCA) outside the DRECP boundary in Appendix R1 (Figure R1.15-1 through Figure R1.15-11).

Table III.15-4
Acres of High Potential Minerals Within the LUPA Decision Area

Areas With High Potential Minerals	Total Acres
Cadiz Valley and Chocolate Mountains	214,000
Imperial Borrego Valley	143,000
Kingston and Funeral Mountains	79,000
Mojave and Silurian Valley	77,000
Owens River Valley	400
Panamint Death Valley	41,000
Pinto Lucerne Valley and Eastern Slopes	52,000
Piute Valley and Sacramento Mountains	34,000
Providence and Bullion Mountains	146,000

Table III.15-4
Acres of High Potential Minerals Within the LUPA Decision Area

Areas With High Potential Minerals	Total Acres
West Mojave and Eastern Slopes	30,000
CDCA Area outside the DRECP boundary	176,000
Total	**992,000**

Notes: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.
Source: BLM California Geology, Energy, Mineral Resource GIS Data 2013

III.15.2.3 High-Priority Mineral and Energy Locations

LUPA Decision Area lands also have existing high-priority mineral or energy locations. These areas are shown in Table III.15-5 and in Figure III.15-2 (also see Figure R1.15-1 through Figure R1.15-11a and R1.15-11b in Appendix R1, which identify mineral resources in ecoregion subareas and the CDCA Area outside the DRECP boundary).

Table III.15-5
Existing High-Priority Mineral or Energy Locations Within the LUPA Decision Area

Mineral or Energy Site	Acres
Cadiz Valley and Chocolate Mountains *Cadiz Evaporites*	2,600
Imperial Borrego Valley *Mesquite Gold Mine – including 650 acres of State Land lease*	9,000
Kingston and Funeral Mountains *Molycorp Rare Earth Element (Mountain Pass Deposit/Mine)*	10,500
Owens River Valley *U.S. Borax Trona Mine – State Land lease*	15,700
Panamint Death Valley *Briggs Mine (Etna)* *Searles Dry Lake Evaporites*	75,000
Providence and Bullion Mountains *Bristol Dry Lake Evaporites* *Hector Clay Mine* *Castle Mountains Mine*	21,000
CDCA Area outside the DRECP boundary	2,000
Total	**135,800**

Notes: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.
Source: BLM California Geology, Energy, Mineral Resource GIS Data 2013

III.15.2.4 Rare Earth Element Areas

Rare earth elements are the 15 elements with atomic numbers 57 through 71, from lanthanum to lutetium ("lanthanides"), plus yttrium (39), which is chemically similar to the lanthanide elements and is therefore typically included with the other rare earth elements. Industrial demand for these elements is relatively small in terms of tons extracted; these elements are essential, however, for a diverse and expanding array of high-technology applications. Rare earth elements containing magnets, metal alloys for batteries and light-weight structures, as well as phosphors are essential for many current and emerging alternative energy technologies including electric vehicles, energy-efficient lighting, and wind power. Rare earth elements are also critical for a number of key defense systems and other advanced applications (Long et al. 2010).

The Mountain Pass Deposit and Mine and Music Valley areas are two high-profile rare earth element sites in the LUPA Decision Area:

- The **Mountain Pass Deposit and Mine** is in the northeastern corner of San Bernardino County. The Mountain Pass igneous complex contains a carbonatite body, called the Sulphide Queen, which comprises the bulk of the rare element resources in the area. The Sulphide Queen is the largest known mass of high-grade rare earth element ore in the United States. Molycorp actively mined the Mountain Pass Deposit and Mine through 2002, when its permit expired (Long et al. 2010). Molycorp began construction in 2011 to expand and modernize the Mountain Pass Mine facility, also known as Project Phoenix. Active mining of earth elements has recommenced at the facility (Molycorp 2014).
- The **Music Valley** area consists of xenotime deposits, of probable Precambrian age, within the Pinto Gneiss. The Music Valley area is a reported deposit with no current exploration activity. Small-scale exploration of these deposits was conducted during the 1950s to determine levels of radioactivity (Long et al. 2010). The California State Lands Commission issued a mineral prospecting permit (CSLC Lease No. PRC 9138.2) to Green Materials International, LLC effective July 1, 2014 to explore for rare earth elements on a State school land section in Music Valley. The California Division of Mines and Geology studied the Music Valley area; results were published in 1964. Evans found that the Music Valley area contained U-Thor deposit, which was intruded by Palms Granite and Gold Park Gabbro-Diorite and was considered to be of the Precambrian age (Evans 1964). The University of California, Santa Barbara is currently studying the rare earth element origin in metamorphic rocks of Music Valley.

Rare earth element areas within the LUPA Decision Area are presented in Table III.15-6 by ecoregion subarea and CDCA Area outside the DRECP boundary, and illustrated in Figure III.15-3.

Table III.15-6
Rare Earth Element Acres Within the LUPA Decision Area

Rare Earth Element Areas	Total Acres
Cadiz Valley and Chocolate Mountains	2,000
Kingston and Funeral Mountains	25,000
Panamint Death Valley	2,000
Pinto Lucerne Valley and Eastern Slopes	12,000
CDCA Area outside the DRECP boundary	19,000
Total	**60,000**

Notes: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.
Source: BLM 2013

III.15.2.5 Locatable, Leasable, and Mineral Materials

A detailed description of locatable, leasable, and mineral materials is presented in Section III.15.1.1. Locatable, leasable (including geothermal), and mineral material areas found within the LUPA Decision Area are presented in Table III.15-7 and in Figure III.15-4.

Table III.15-7
Locatable, Leasable, and Mineral Material Acres Within the LUPA Decision Area

Development	Locatable Acres	Leasable Acres	Mineral Material Acres
Cadiz Valley and Chocolate Mountains			
Existing Development	48,000	39,000	100
Foreseeable Development	36,000		6,000
Imperial Borrego Valley			
Existing Development	47,000		20,000
Foreseeable Development			16,000
Kingston and Funeral Mountains			
Existing Development	63,000		4,000
Foreseeable Development	56,000		5,000
Mojave and Silurian Valley			
Existing Development	9,000		<100
Foreseeable Development	300		200
Owens River Valley			
Existing Development			2,000
Foreseeable Development	3,000		

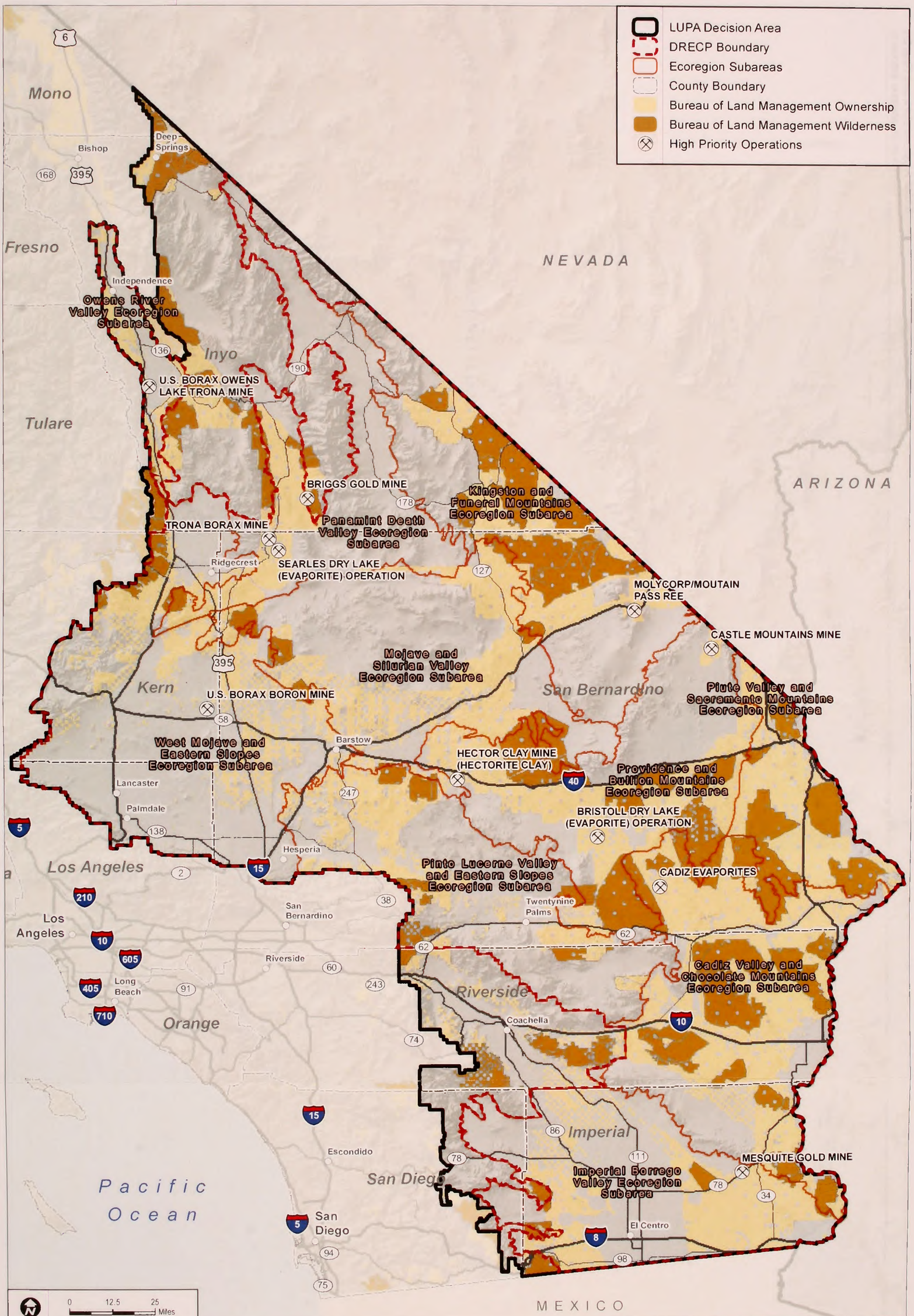
Table III.15-7
Locatable, Leasable, and Mineral Material Acres Within the LUPA Decision Area

Development	Locatable Acres	Leasable Acres	Mineral Material Acres
Panamint Death Valley			
Existing Development	6,000		3,000
Foreseeable Development	500		
Pinto Lucerne Valley and Eastern Slopes			
Existing Development	3,000		
Foreseeable Development			
Piute Valley and Sacramento Mountains			
Existing Development	58,000		700
Foreseeable Development	73,000		43,000
Providence and Bullion Mountains			
Existing Development	60,000	32,000	400
Foreseeable Development	67,000		8,000
West Mojave and Eastern Slopes			
Existing Development	5,000		4,000
Foreseeable Development	300		
CDCA Area outside the DRECP boundary	**7,000**		**6,000**
Total	**542,100**	**71,000**	**118,400**

Notes: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.
Source: BLM 2013

III.15.2.6 Oil and Gas Resources

Based on review of mining data and BLM information, there are no oil and gas resources within the LUPA Decision Area.



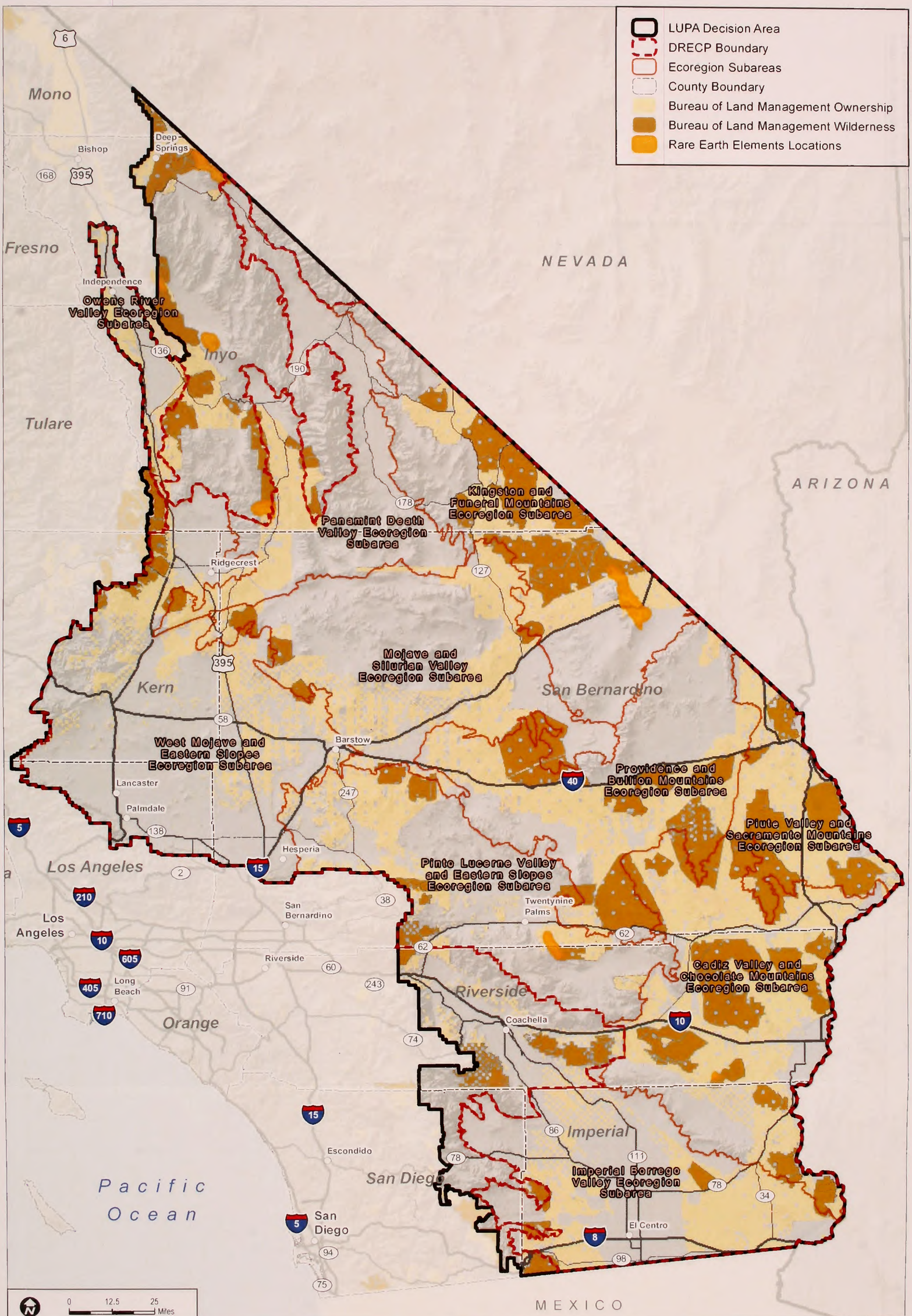
Sources: ESRI (2014); BLM (2015); RECON (2015)

FIGURE III.15-2

Existing High Priority Mineral or Energy Locations with the LUPA Decision Area

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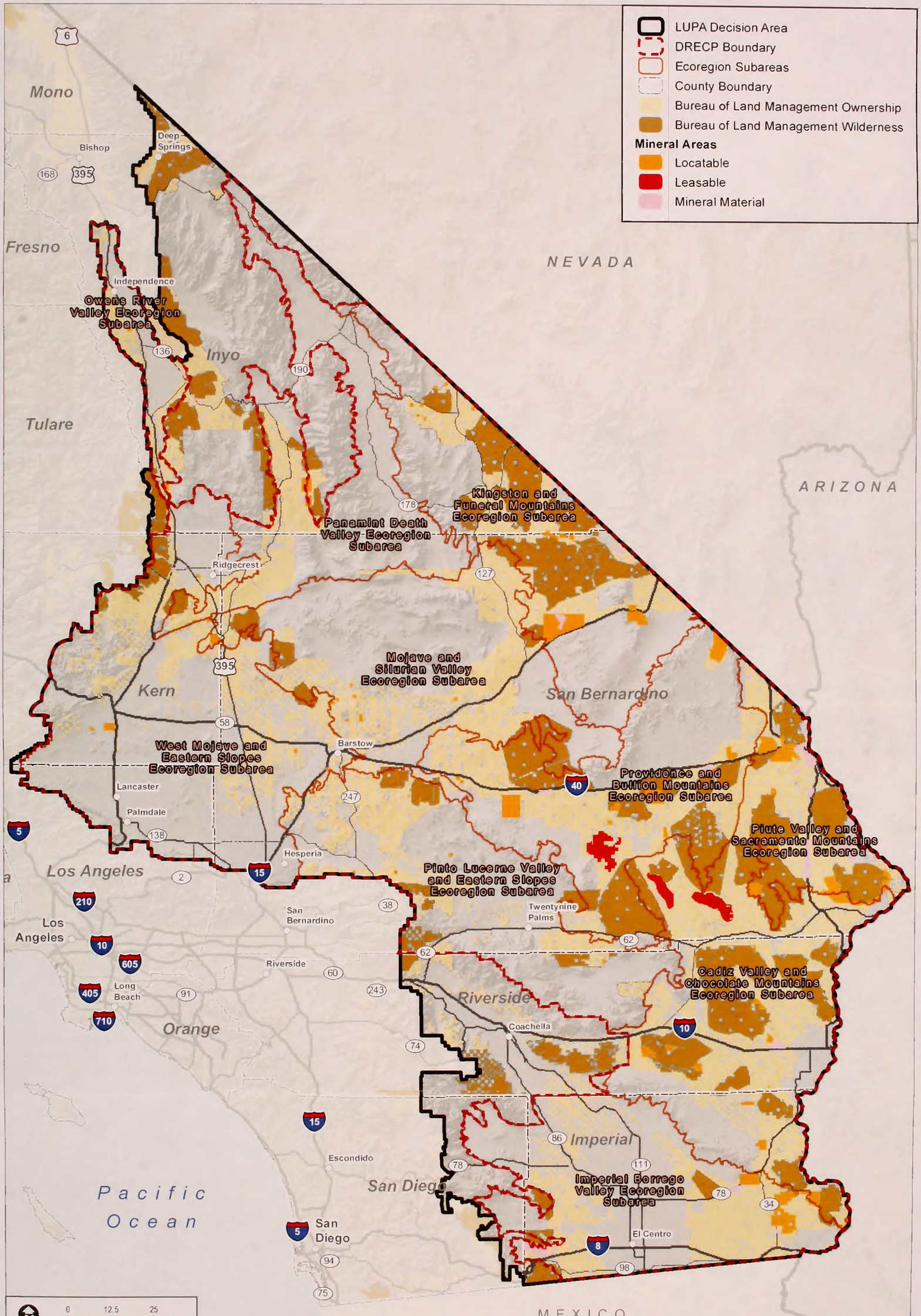
Sources: ESRI (2014); BLM (2015); RECON (2015)

FIGURE III.15-3

Rare Earth Element Locations within the LUPA Decision Area

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Sources: ESRI (2014); BLM (2015); RECON (2015)

FIGURE III.15-4

Locatable, Leasable, and Mineral Material Areas within the LUPA Decision Area

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III.15.3 Transmission Outside the DRECP Area

Required transmission facilities outside the DRECP area generally fall into four geographic areas: San Diego, Los Angeles, North Palm Springs–Riverside, and Central Valley. Information gathered from four large transmission projects in these areas forms the basis of the following discussion on mineral resources and transmission. This section describes the mineral and oil resources in these areas, including a specific listing of resources within 1,000 feet of either side of the project routes analyzed. The descriptions and analyses in this section are based on:

- Maps and data from the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources.
- The U.S. Geological Survey Mineral Resources Data System.
- The BLM's Legacy Rehost System (LR2000), Land and Mineral Reports.
- Aerial imagery from the California Geological Survey, previously known as the California Division of Mines and Geology.

Table III.15-8 presents an overview of the types and numbers of mineral resources along the transmission corridors outside the DRECP area.

Table III.15-8
Mineral Resources Outside the DRECP Area

Corridor	Regional Mineral Resources	Number of Mineral Resources Along Corridor	Regional Oil Resources	Oil Fields Along Corridor
San Diego	Sand, gravel, gold, phosphorous, tungsten, crushed stone	14	3 wildcat oil wells	None
Los Angeles	Sand, gravel, rock products, clay, gold, copper, tungsten	10	30 active oil and/or gas fields in operation and many small abandoned oil/gas fields in the LA area	1 – Montebello
North Palm Springs–Riverside	Sand, gravel, gold	4	None	None

Table III.15-8
Mineral Resources Outside the DRECP Area

Corridor	Regional Mineral Resources	Number of Mineral Resources Along Corridor	Regional Oil Resources	Oil Fields Along Corridor
Central Valley	Sand, gravel	2 (plus 6 small gravel operations)	Coalinga, Coalinga East Extension, Jacalitos, Guijarral Hills, Pleasant Valley, Kettleman Hills, Pyramid Hills	4 – Coalinga, Coalinga East, Guijarral Hills, Pleasant Valley

Sources: California Public Utilities Commission (CPUC) and BLM 2008; CPUC and U.S. Forest Service 2010; CPUC 2001; CPUC and BLM 2006

III.15.3.1 San Diego Area

This transmission corridor extends from Ocotillo, in southwestern Imperial County, to San Diego, and roughly follows the existing Sunrise Powerlink corridor westward.

Metallic and nonmetallic mineral deposits are in both San Diego and Imperial counties. The principal minerals in San Diego County are sand, gravel, and crushed and broken stone. Lesser mineral commodities also produced in San Diego County include dimension stone, clay, gem, and other minerals and salts. Imperial County produces a variety of mineral commodities, including gypsum, gravel, gold, manganese, pumice, and crushed stone. There are varying amounts of metallic mineral deposits in both counties, primarily in mountainous bedrock areas. Gold, copper, and tungsten are primary metallic minerals (ores) mined in these counties.

Records for mining claims on BLM land were reviewed using land and mineral reports in BLM's Legacy Rehost System (LR2000). No mining claims were found in the San Diego-area corridor. GIS data from the U.S. Geological Survey Mineral Resources Data System (MRDS) for Imperial and San Diego counties were reviewed, and mining potential was identified along the Sunrise Powerlink transmission route. These locations were further confirmed and verified through aerial photos.

Fourteen sites on private lands with either mineral occurrences or past or current mining activities were identified in the San Diego area transmission corridor: two sand and gravel quarries; seven gold mines (three producers and four prospects); one occurrence of gold, phosphorous, and tungsten; one past producer of tungsten; and one crushed stone producer. California Department of Conservation, Division of Oil, Gas, and Geothermal Resources (DOGGR) online maps indicate no oil or gas fields in the San Diego area. The San Diego County map shows three drilled wildcat oil wells in the Ocotillo Wells area north of

Highway 78 and the Ocotillo Wells Airport. Online DOGGR maps show several geothermal fields in Imperial County near the San Diego area (CPUC and BLM 2008).

III.15.3.2 Los Angeles Area

Transmission corridors extend from Palmdale to the Los Angeles Basin, roughly following segments 6, 7, and 11 of the Tehachapi Renewable Transmission Project.

There are metallic and nonmetallic mineral deposits in the Los Angeles area. Metallic mineral deposits are primarily in mountainous areas of exposed igneous and metamorphic bedrock. Nonmetallic mineral resources including sand, clay, gravel, rock products, and petroleum are important state mineral resources actively mined in the Los Angeles area.

Both metallic and nonmetallic mineral resources lie in and around the Los Angeles area. Mineral resources in nearby Kern County include limestone and dolomite deposits, which are used to make cement. In Los Angeles County the principal mineral commodities are sand, gravel, and crushed and broken stone. Metallic mineral deposits are in both counties, primarily in mountainous bedrock areas, though there are no active metallic mines in or around the DRECP area.

Ten sites with either minerals or past or current mining activities lie along the Tehachapi Renewable Transmission Project corridor. These sites include three metallic mineral (ore) mines, one mapped ore site, two ore prospects, three sand and gravel quarries, and one crushed/broken stone quarry. Eight of the ten sites are inactive: one ore site, two ore prospects, three past ore (gold) producers, a past gravel quarry, and a past crushed/broken rock quarry. The quarries have been reclaimed and are occupied today by buildings and parking lots. None are listed as active mines by California Geological Survey. The two active sites are sand and gravel quarries in the Irwindale area, the Duarte and Irwindale Pits. The Irwindale Pit contains three adjacent pits (commonly known as Irwindale Pits #1, #2, and #3) owned by the United Rock Products Corporation; two are currently operational.

The Los Angeles Basin contains more than 30 operational oil and/or gas fields as well as many small abandoned oil/gas fields. DOGGR online maps show several active and abandoned oil or gas fields in the DRECP area vicinity, including the adjacent Montebello oil field (CPUC and U.S. Forest Service 2010).

III.15.3.3 North Palm Springs–Riverside Area

Both metallic and nonmetallic mineral deposits are in the North Palm Springs–Riverside area. Metallic mineral deposits are primarily in mountainous areas of exposed bedrock. There are no active metallic mineral mines in the vicinity. Sand, clay, gravel, and rock products are important mineral resources in California and still actively mined in the area.

The MRDS identified four mineral resource sites within the proposed Devers–Palo Verde No. 2 transmission right-of-way: two sand and gravel operations and one gold prospect in the Coachella Valley area, and one gold mine on the Palo Verde Mesa. Only the Indio Pit, a sand and gravel quarry in the Indio Hills area, is still operational (CPUC and BLM 2006).

III.15.3.4 Central Valley

The Central Valley transmission corridor extends from Rosamond in the North Mojave Desert to Tracy, roughly following the existing Path 15 and 26 corridors. Mineral resources in the Central Valley area, including petroleum, gypsum, and sand and gravel, have been mined at several locations. The region is also at the center of controversial recent proposals to extract oil from the underlying Monterey Shale Formation through hydraulic fracturing, known as fracking (Sommer 2012; Clean Water Action 2013).

III.15.3.4.1 Petroleum

There are oil and natural gas deposits in the southern part of the Central Valley area near Coalinga. Exploration for petroleum began in the 1890s near Oil City, about 10 miles north of Coalinga. Since that time, several major oil fields have been developed in the western hills of the Coast Ranges (CPUC 2001). In 2012, annual production in large fields in the area included Midway Sunset (29.3 million barrels), South Belridge (23.6 million barrels), Cymric (13.6 million barrels), Lost Hills (11.0 million barrels), and Coalinga (5.5 million barrels) (CEC 2012; DOGGR 2012).

Production in other oil fields in the vicinity included Jacalitos (139,000 barrels), Kettleman City (68 barrels), Pyramid Hills (58,000 barrels), Kettleman Middle Dome (58,000 barrels), Kettleman North Dome (26,000 barrels), and Coalinga East Extension (8,000 barrels) (DOGGR 2012).

While natural gas fields do not produce as much as oil fields, there are several active fields in the area. Natural gas withdrawals in 2012 totaled 2,969,299 cubic feet (Mcf) in DOGGR District 4 (Kern, Tulare, and Inyo counties) and 1,747,856 Mcf in District 5 (including Fresno, Stanislaus, Madera, Merced, San Benito counties, as well as other counties east to the Nevada border) (DOGGR 2012).

III.15.3.4.2 Sand and Gravel

Isolated, limited deposits of sand and gravel have been extracted at several small quarry operations in the Central Valley area. These operations are generally in the valleys draining the Diablo Range and are removing recent alluvial deposits from the valley floors. There are operations on Los Banos Creek, Little Panoche Creek, Panoche Creek, Cantua Creek, and at Los Gatos Creek north of the Coalinga Airport. A large pit operation is at the Folsom

gravel pit on Los Gatos Creek, one mile north of Coalinga. Most developed and potential sources of aggregate in the Central Valley area have difficulty meeting strict federal specifications for aggregate materials. That is why the Folsom deposits, which do meet the standards, have been extensively developed. Potential aggregate fill and select fine sands sources were previously identified for development in tandem with the Los Banos Grandes Reservoir project (CPUC 2001). A feasibility report was prepared in 1990, but the proposed project had not been constructed as of 2014.

III.15.3.4.3 Gypsum

Quaternary deposits of impure gypsum have been mined near Los Banos and at other isolated locations along the west side of the San Joaquin Valley. These materials are used in agriculture as fertilizers or soil amendments. No known commercially viable gypsum extraction areas are in the Central Valley area (CPUC 2001).

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III.16 LIVESTOCK GRAZING

This chapter focuses on livestock grazing resources for the Desert Renewable Energy Conservation Plan (DRECP) Bureau of Land Management (BLM) Land Use Plan Amendment (LUPA). The description of the environmental baseline focuses on BLM grazing allotments (which occur primarily on BLM lands).

III.16.1 Regulatory Setting

The primary laws that govern grazing on public lands are the Taylor Grazing Act of 1934, as amended, the Federal Land Policy and Management Act (FLPMA) of 1976, and the Public Rangelands Improvement Act of 1978. The BLM's management of grazing on public lands is described in its own and in other federal regulations (43 Code of Federal Regulations [CFR] 4100, BLM Handbooks 4100 to 4180, and BLM Manual H-4120-1).

III.16.1.1 Bureau of Land Management Administration

III.16.1.1.1 Public Land Grazing Administration 43 CFR 4100

The BLM administers the public lands grazing program under provisions in regulations (43 CFR 4100). These regulations address implementation of provisions in the Taylor Grazing Act of 1934, FLPMA of 1976, and the Public Rangelands Improvement Act of 1978. The Taylor Grazing Act set forth regulations intended to stop injury to the public grazing lands by preventing overgrazing and soil deterioration; provide for the lands' orderly use, improvement, and development; and stabilize the livestock industry dependent upon the public range. FLPMA provides authority and direction for the multiple use and sustained yield of public lands. FLPMA also provides specific guidance for range management (FLPMA Subchapter IV). The Public Rangelands Improvement Act establishes a national policy to improve public rangeland conditions to support all rangeland values. The act also requires a national inventory, consistent federal management policies and funding for range improvement projects.

BLM regulations (43 CFR 4100) require that grazing standards and guidelines promote rangeland health. The regulations also require permits and leases that conform with either general standards or standards approved for a given area where a grazing allotment is located. Other terms and conditions may be specified in grazing permits or leases if they achieve management objectives, provide for proper range management, or assist in the orderly administration of public rangelands. Terms and conditions for grazing permits and leases must conform with BLM land use plan requirements.

III.16.1.1.2 Bureau of Land Management California Instruction Memorandum CA-2013-006

The BLM California State Office Instruction Memorandum provides direction for implementing provisions of the Consolidated Appropriations Act of 2012 related to livestock grazing in areas covered by the California Desert Conservation Area (CDCA) Plan. The Consolidated Appropriations Act includes one modified and three new general provisions that affect BLM's livestock grazing program. The BLM's Washington Office Instruction Memorandum (WO-IM-2012-096) provides direction for implementing the Consolidated Appropriations Act, except for specific provisions that apply solely to the CDCA Plan and amendments.

The Consolidated Appropriations Act directs the Secretary of the Department of Interior (DOI) to accept the donation of some existing grazing permits or leases in the CDCA. The term "donation" in this context means the voluntary relinquishment of a grazing permit or lease on a public grazing allotment.

III.16.1.2 Standard Operating Procedures (Management Guidelines)

III.16.1.2.1 43 Code of Federal Regulations, Section 4180.2 Standards and Guidelines for Grazing Administration

Fallback Standards (in effect until CDCA standards are approved)

1. Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, and landform.
2. Riparian wetland areas are in properly functioning condition.
3. Stream channel morphology (including but not limited to gradient, width/depth ratio, channel roughness and sinuosity) and functions are appropriate for the climate and landform.
4. Healthy, productive, and diverse populations of native species exist and are maintained.

Fallback Guidelines (in effect until CDCA guidelines are approved)

1. Management practices maintain or promote adequate amounts of ground cover to support infiltration, maintain soil moisture storage, and stabilize soils.
2. Management practices maintain or promote soil conditions that support permeability rates that are appropriate to climate and soils.

3. Management practices maintain or promote sufficient residual vegetation to maintain, improve or restore riparian-wetland functions of energy dissipation, sediment capture, groundwater recharge, and stream bank stability.
4. Management practices maintain or promote stream channel morphology (e.g., gradient, width/depth ratio, channel roughness and sinuosity) and functions that are appropriate to climate and landform.
5. Management practices maintain or promote the appropriate kinds and amounts of soil organisms, plants, and animals to support the hydrologic cycle, nutrient cycle, and energy flow.
6. Management practices maintain or promote the physical and biological conditions necessary to sustain native populations and communities.
7. Desired species are being allowed to complete seed dissemination in one out of every 3 years; management actions will promote the opportunity for seedling establishment when climatic conditions and space allow.
8. Conservation of federal threatened or endangered species, Proposed Category 1 and 2 candidates, and other special-status species is promoted by the restoration and maintenance of their habitats.
9. Native species are emphasized in support of ecological function.
10. Non-native plant species are used only in situations where native species are not readily available in sufficient quantities or are incapable of maintaining or achieving properly functioning conditions and biological health.
11. Periods of rest from disturbance or livestock use during times of critical plant growth or regrowth are provided when needed to achieve healthy, properly functioning conditions. (The timing and duration of use periods shall be determined by the authorized officer.)
12. Continuous, season-long livestock use is allowed only when it has been demonstrated to be consistent with achieving healthy, properly functioning ecosystems.
13. Facilities are located away from riparian wetland areas where they conflict with achieving or maintaining riparian wetland function.
14. The development of springs and seeps or other projects affecting water and associated resources shall be designed to protect the ecological functions and processes of those sites.
15. Grazing on designated ephemeral (annual and perennial) rangeland is allowed only if reliable estimates of production have been made, residue to remain on site at the end of the grazing season has been established, and adverse effects on perennial species have been avoided.

Grazing Management Practices

1. Salting is not permitted within one-quarter mile of riparian zones, aspen groves and meadows, sensitive plant habitats, or sites that are highly susceptible to soil erosion.
2. Sheep will be herded.
3. Sheep bedding grounds will be designated, and will not be located within one-quarter mile of riparian zones, aspen groves and meadows, sensitive plant habitats, or sites that are highly susceptible to soil erosion.
4. Trailing routes will be identified and controlled.
5. Proposed livestock conversions will be considered on the basis of resource needs, allotment capability, and management objectives. If conversions are made mainly for the convenience of the permittee, range improvement structures necessary to implement the conversion will be constructed and paid for by the permittee.
6. Annual checks will be conducted during the grazing season on selected meadows and key wildlife habitats to ensure compliance.
7. Trampling of soils will be monitored in conjunction with forage utilization to determine whether the limit of allowable grazing has been achieved.

Range Improvement Project Development

1. Livestock watering and handling facilities (e.g., corrals, chutes, and dipping vats) will normally not be located within one-quarter mile of riparian zones, aspen groves and meadows, sensitive plant habitats, or sites that are highly susceptible to soil erosion.
2. Fence construction will conform with BLM objectives and specifications (BLM Manual 1737).
3. All livestock watering facilities will be designed to encourage wildlife use. Wildlife escape ramps will be installed and maintained in water troughs.
4. Springs and seeps that could be trampled by livestock will be fenced.
5. Benefits to range, fisheries, wildlife, recreation, and watershed will be considered when designing range improvement projects.
6. Vegetation manipulation projects will be protected from grazing for at least two growing seasons following treatment.
7. Vegetation manipulation projects will be planted in irregular patterns to create more edge. Islands of vegetation will be left for cover.
8. All chemical applications require an approved pesticide use proposal and supervision by a Certified Pesticide Specialist. Before chemicals are applied, BLM

will comply with DOI regulations (BLM Manual 9222) and other applicable laws, regulations, and court orders. Herbicide use will be prohibited within 150 feet of streams. Any pesticide (as defined under Section 2 (u) of the Federal Insecticide, Fungicide, and Rodenticide Act, as amended) must be:

a) Registered with the Environmental Protection Agency and the State of California

b) Specifically registered for the proposed use

c) Used only in accordance with requirements for safe mixing, storing, loading, and disposal

d) Marked with a current label

e) Used in accordance with its label and all applicable federal, state, and local laws and regulations

f) Applied so that worker safety is ensured

9. Maintenance of structural improvements shall be provided by the beneficiary of the improvement.
10. All vegetation manipulations will leave 200 feet of undisturbed vegetation on both sides of all roads. Vegetation will not be manipulated on drainages with over 30% slope.
11. Seed mixtures adapted to the planting site will be used for seeding. Mixtures will include a variety of browse, forbs, and grass species that are desirable for both livestock and wildlife. All seed sources will be certified "weed free."
12. Burned areas will be rested for a minimum of two growing seasons before grazing.

III.16.1.2.2 Relinquishments of Grazing Permits/Lessees

The Consolidated Appropriations Act (Public Law 112-74) concludes that BLM must accept relinquishment of all donated grazing permits/leases (in the CDCA) that were in effect at the inception of the law. Upon BLM's acceptance, the grazing allotment will be permanently closed. At this time, 16 previously relinquished allotments will permanently close and all forage will be allocated to wildlife or ecosystem functions through the DRECP and LUPA process.

III.16.2 Grazing in the Land Use Plan Amendment Decision Area

III.16.2.1 Livestock Grazing Allotments

The LUPA Decision Area contains one grazing district, California District 1–Mojave (Figure III.16-1, Harpold 2006). This grazing district is in the northern portion of the LUPA Decision Area, in the Owens River Valley, West Mojave and Eastern Slopes, Panamint Death Valley, and Mojave and Silurian Valley ecoregion subareas and extends into the CDCA Area outside the DRECP boundary.

Over 65 grazing allotments are in the LUPA Decision Area (see Figure III.16-1), totaling approximately 2.5 million grazing allotment acres on BLM-managed lands (based on BLM GIS data for grazing allotments). Table III.16-1 shows grazing allotments in the LUPA Decision Area, including the Bishop field office (Figure III.16-2) and Bakersfield field office (Figure III.16-3).

Table III.16-1
Grazing Allotments in the LUPA Decision Area

Allotment No.	Allotment Name	BLM Acres	Other Federal Acres	State Acres	Private/ Other Acres	Total Allotment Acres	Active Animal Unit Months	Type of Livestock
CDCA Plan Area								
05001	Eureka Valley	16,000	0	0	0	16,000	0	Cattle
05002	Kelso Peak	2,700	100	0	0	2,700	110	
05005	Cantil Common	203,000	0	4,000	12,000	218,000	19,033	Sheep
05006	Hansen Common	35,000	0	0	0	35,000	354	Cattle
05007	Monolith Cantil	14,000	0	0	4,000	18,000	1,500	Sheep
05008	Rudnick Common	164,000	14,000	400	48,000	227,000	9,474	Cattle
05009	Tunawee	77,000	0	0	4,000	56,000	1877 cattle or 716 Sheep	Cattle, Sheep
05010	Darwin	21,000	0	0	0	21,000	0	
05011	Olancha Common	15,000	0	200	0	14,000	606	Cattle
05012	Lacey-Cactus-McCloud	256,000	0	600	0	148,000	790	Cattle

Table III.16-1
Grazing Allotments in the LUPA Decision Area

Allotment No.	Allotment Name	BLM Acres	Other Federal Acres	State Acres	Private/ Other Acres	Total Allotment Acres	Active Animal Unit Months	Type of Livestock
05013	Hunter Mountain Lee Flat	53,000	0	0	0	53,000	5	Cattle
05014	Walker Pass Desert	35,000	0	0	0	35,000	0	Sheep
05050	Bissell	800	0	0	0	800	2	Sheep
05051	Warren	600	0	0	0	600	55	Sheep
05052	Antelope Valley	7,000	0	0	0	7,000	545	Sheep
05053	Oak Creek	200	0	0	0	200	16	Cattle
05055	Spangler Hills	58,000	0	900	11,000	70,000	760	Sheep
05057	Boron Sheep	11,000	0	0	72,000	83,000	0	Sheep
05059	Oasis Ranch	23,000	0	0	0	23,000		
05060	White Wolf	14,000	0	0	0	14,000	307	
05061	Last Chance	35,000	0	0	0	35,000	396	Cattle
05062	Deep Springs Valley	40,000	0	0	0	40,000	1,250	Cattle
05063	South Oasis	15,000	0	0	0	15,000	477	Cattle
05066	Double Mountain	600	0	0	0	600	38	Cattle
06001	Rice Valley	47,000	0	600	0	48,000	0	Sheep
08000	Pahrump Valley	26,000	0	700	0	27,000	550	Cattle
08001	Valley Well	500	0	0	0	500	24	Horse
08003	Rattlesnake Canyon	27,000	0	0	0	27,000	1,044	Cattle (996) Horse (48)
08004	Harper Lake	18,000	0	0	0	18,000	600	Cattle Closure Agreement
08005	Ord Mountain	125,000	0	5,000	19,000	149,000	3,632	Cattle (3,537) Horse (92)
08006	Cady Mountain	160,000	0	7,000	0	167,000	2,010 Unavailable for Livestock Grazing	Cattle Closure Agreement

Table III.16-1
Grazing Allotments in the LUPA Decision Area

Allotment No.	Allotment Name	BLM Acres	Other Federal Acres	State Acres	Private/ Other Acres	Total Allotment Acres	Active Animal Unit Months	Type of Livestock
08007	Cronese Lake	49,000	0	100	12,000	61,000	500 Unavailable for Livestock Grazing	Cattle Closure Agreement
08010	Stoddard Mountain	17,000	0	6,000	0	23,000	0	Sheep
08011	Shadow Mountains	17,000	0	0	0	17,000	0	Sheep
08012	Buckhorn Canyon	7,000	0	0	0	7,000	0 Not active	Sheep
08013	Round Mountain	15,000	0	0	0	15,000	880	Cattle
08014	Johnson Valley	118,000	0	1,000	0	120,000	0 Not active	Sheep
09000	Valley View	32,000	0	900	0	33,000	424	Cattle Expired Lease
09003	Clark Mountain	45,000	18,000	4,000	0	67,000	643	Cattle
09004	Piute Valley	19,000	0	0	0	19,000	0 Not active	No Livestock
09007	Horse Thief Springs	150,000	0	4,000	800	155,000	2,424	Cattle
09008	Kessler Springs	14,000	0	0	0	14,000	481 Not active	Cattle
09013	Crescent Peak	7,000	0	0	0	7,000	359 Unavailable for livestock grazing	Cattle
09017	Jean Lake	10,000	0	0	0	10,000	300 Not active	Cattle
09018	Chemehuevi Valley	116,000	0	0	0	116,000	0 Not active	No Livestock
09076	Lazy Daisy	285,000	0	8,000	38,000	330,000	3,192	Cattle
BLM Bishop Field Office								
06015	Sawmill Creek	2,000	0	0	2,000	4,000	24	Cattle
06019	West Crater Mountain	7,000	0	0	0	7,000	331	Cattle
06023	Black Mine	2,000	0	0	0	2,000	47	Cattle
06033	Tinemaha	4,000	0	0	0	4,000	220	Cattle

Table III.16-1
Grazing Allotments in the LUPA Decision Area

Allotment No.	Allotment Name	BLM Acres	Other Federal Acres	State Acres	Private/ Other Acres	Total Allotment Acres	Active Animal Unit Months	Type of Livestock
06042	Ash Creek	3,000	0	0	0	3,000	243	Cattle
06046	Alabama Hills	65,000	0	2,000	4,000	72,000	1,364	Cattle
06047	Red Mountain	5,000	0	0	0	5,000	304	Cattle
06048	West Santa Rita	300	0	0	0	300	8	Cattle
06049	Aberdeen	4,000	0	0	0	4,000	231	Cattle
06050	Poverty Hills	4,000	0	0	0	4,000	78	Cattle
06079	East Crater Mountain	4,000	0	0	0	4,000	136	Cattle
06082	George Creek	3,000	0	0	0	3,000	183	Cattle
BLM Bakersfield Field Office								
00045	Goldpan Canyon	500	0	0	0	500	84	Cattle
00049	Loraine	700	0	0	0	700	113	Cattle
00051	Studhorse Canyon	500	0	0	0	500	100	Cattle
00059	Loco Bill Canyon	600	0	0	0	600	82	Cattle
00081	Nellie's Nipple	4,000	0	0	0	4,000	528	Cattle
00111	Sand Canyon	3,000	0	0	0	3,000	431	Cattle

For ephemeral/perennial allotments designated in the CDCA Plan, the perennial Animal Unit Months (AUMs) do not appear on permits.

Notes: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total in the table.

The BLM Acres, Other Federal Acres, Private/Other Acres, Active AUMs, and Type of Livestock information in this table have been taken from the BLM's Rangeland Administration System. The State Acres were generated from the database used by the Contractors and may or may not be charged for grazing. The lands listed in this table (other than State Acres) are authorized to be grazed by BLM permittees/lessees. Numbers represent all of the acres and AUMs contained in the allotment.

Based on Farmland Mapping and Monitoring Program mapping, there are approximately 989,100 acres of private grazing lands in the LUPA Decision Area. Because BLM grazing allotments include private permittee-owned/controlled-base property, some private lands are included in the BLM grazing allotment analysis.

III.16.3 Transmission Outside the DRECP Area

III.16.3.1 Federal Grazing Allotments

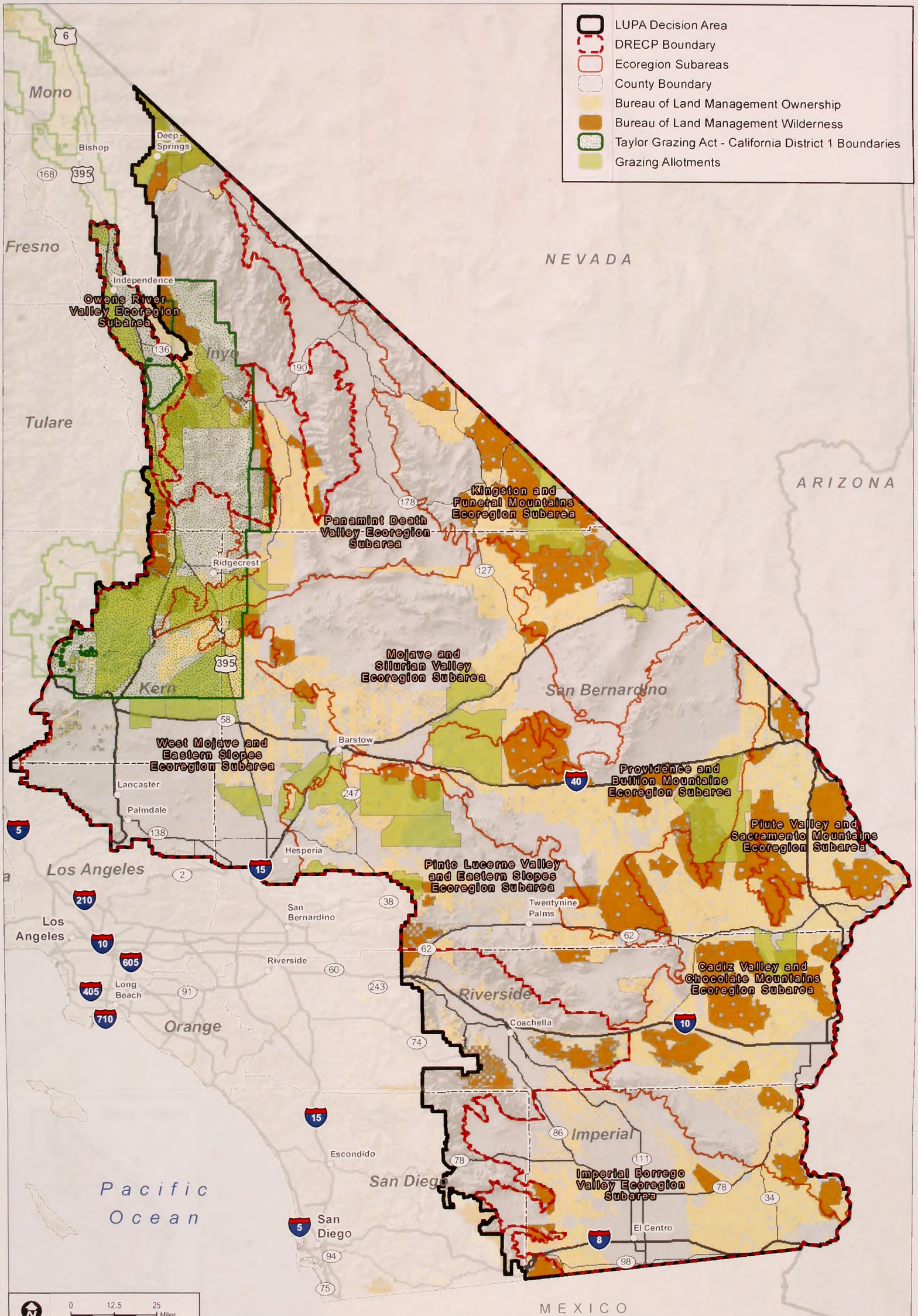
The transmission corridors outside the DRECP area are in the San Diego, Los Angeles, North Palm Springs–Riverside, and Central Valley areas. The area within 1.5 miles of the center of the transmission corridors was reviewed for the presence of designated grazing areas. To be conservative, this 3-mile-wide swath was chosen to account for potential deviations from the conceptual plan.

In the Los Angeles and North Palm Springs–Riverside areas, there are no grazing allotments within a 3-mile-wide swath of the transmission corridors. Table III.16-2 lists the grazing allotments that would be either traversed or within the 3-mile-wide swath for transmission corridors in the San Diego and Central Valley areas.

Table III.16-2
Grazing Allotments Outside the DRECP Area

Grazing Allotment	Distance From Corridor (in miles)
San Diego Area	
Hauser Mountain	Traversed for 0.5 mile
Clover Flat	Traversed for 1.8 miles
Central Valley Area	
Los Banos Ranch	Traversed for 11 miles
Little Panoche	Traversed for 1.8 miles
East Little Panoche	Traversed for 0.9 mile
De Pavo	1.1
Moreno Gulch	0.1
Dosados Canyon	0.5
Manning	Traversed for 3 miles
Silver Creek	0.6
Gorham Ranch	1.5
Ciervo Hills	0.4
Cantua Ranch	Traversed for 16 miles
Harris Jack A	Traversed for 5.5 miles
WJM Sheep Co.	0.7
Cal-West	0.8
Lasgoity	Traversed for 1.4 miles
Wood	Traversed for 0.3 mile
Kettleman Hills	0.7
Surprise Arroyo	0.9

Source: BLM 2013



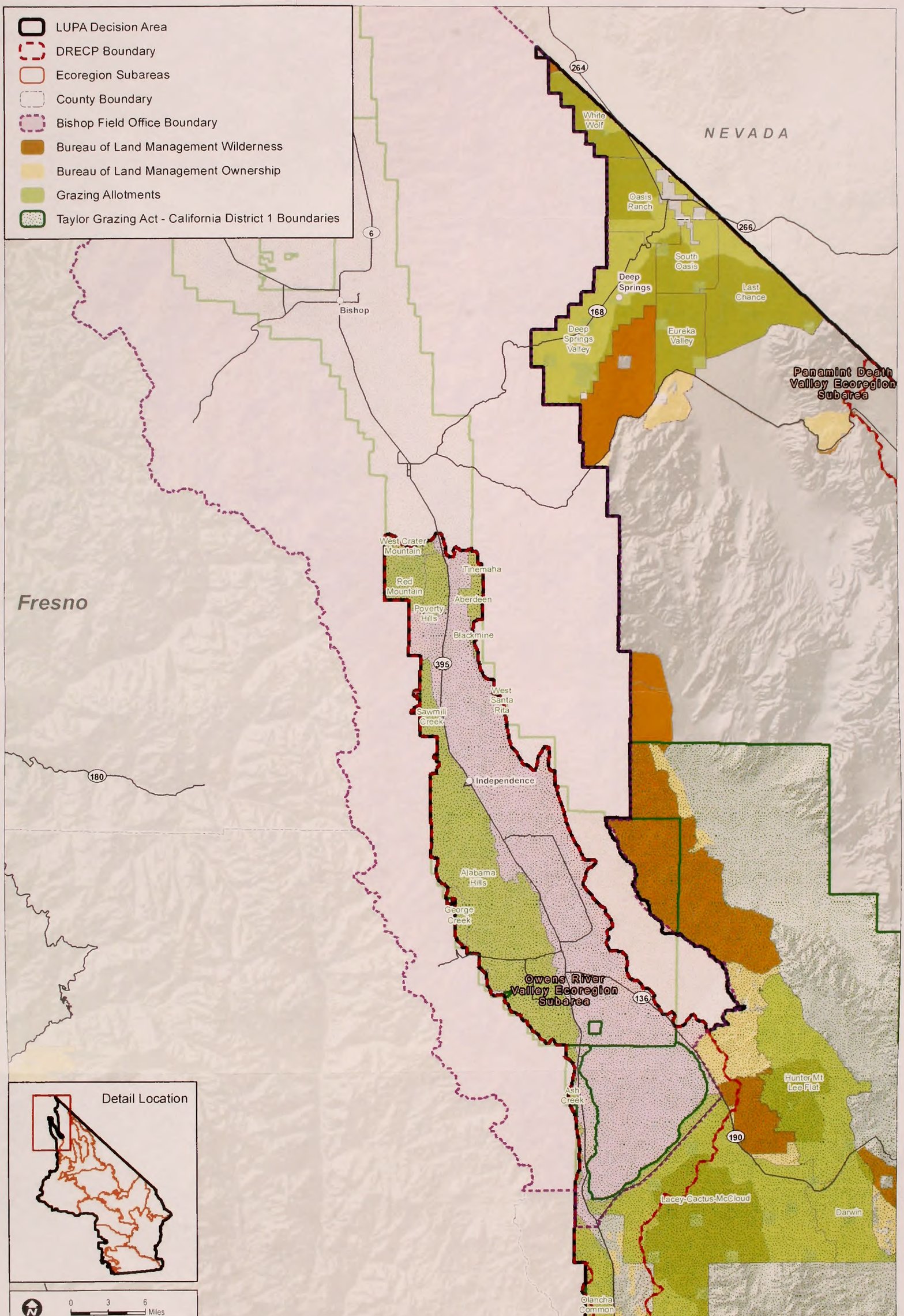
Sources: ESRI (2014), BLM (2015), RECON (2015)

FIGURE III.16-1

Grazing District and Grazing Allotments within the LUPA Decision Area

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Sources: ESRI (2014); BLM (2015); RECON (2015)

FIGURE III.16-2

Grazing Allotments within the BLM Bishop Field Office

DRECP Proposed LUPA and Final EIS

October 2015

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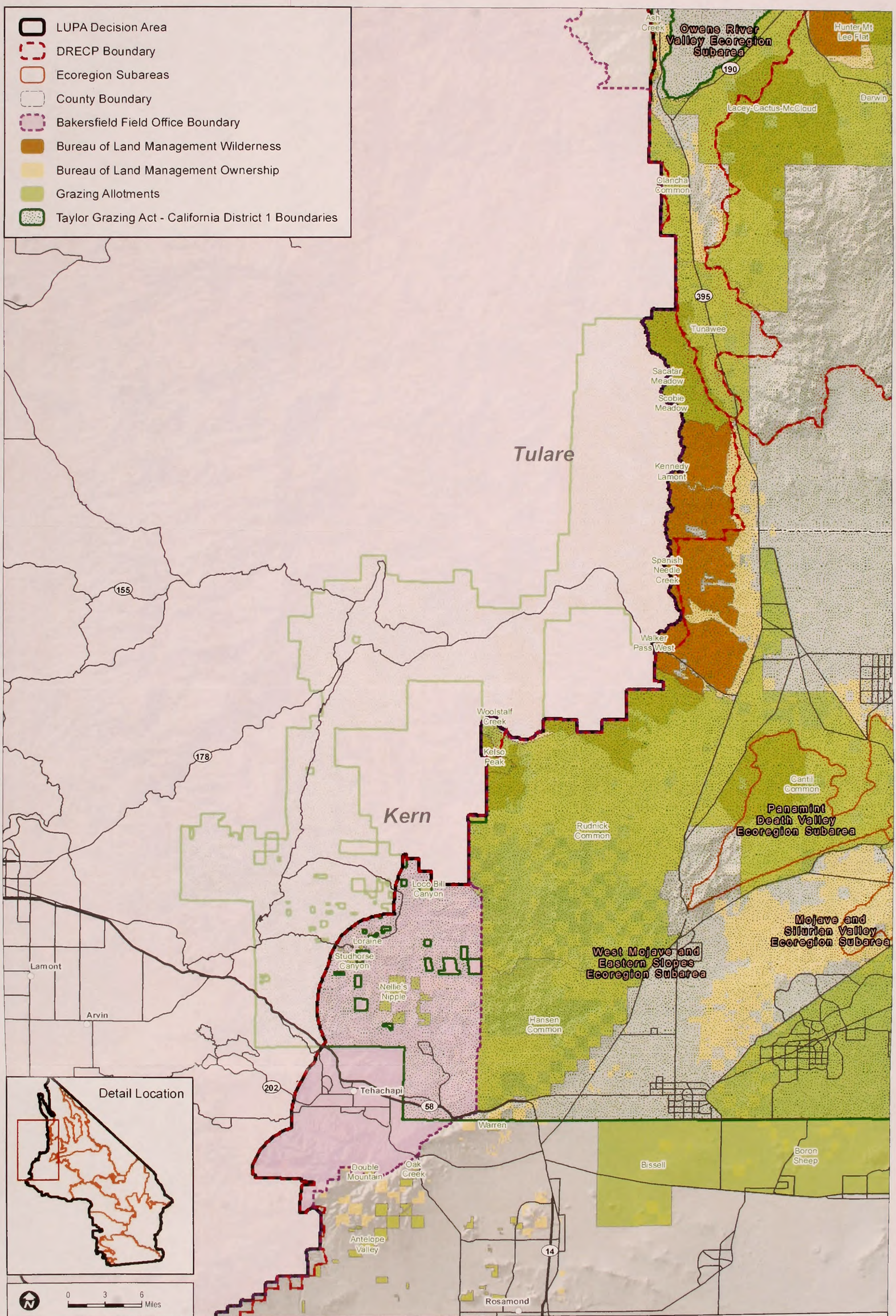


FIGURE III.16-3

Grazing Allotments within the BLM Bakersfield Field Office

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III.17 WILD HORSES AND BURROS

This chapter presents the environmental setting and affected environment for the Desert Renewable Energy Conservation Plan (DRECP) Bureau of Land Management (BLM) Land Use Plan Amendment (LUPA) for wild horses and burros. It describes the environmental setting for the LUPA Decision Area on federal lands; wild horses and burros are managed only on federal lands.

III.17.1 Regulatory Setting

III.17.1.1 Wild Free-Roaming Horses and Burros Act of 1971

Wild horses and burros are protected by the Wild Free-Roaming Horses and Burros Act of 1971 (16 United States Code 1331-1340), as amended by the Federal Land Policy and Management Act and the Public Rangelands Improvement Act of 1978. The Wild Free-Roaming Horses and Burros Act protects wild, free-roaming horses and burros and their habitats. It directs BLM and the U.S. Forest Service (USFS) to manage, in their respective jurisdictions, these wild animals on public lands.

The general management objectives for wild horses and burros are to:

1. Protect and manage viable, healthy herds while retaining their free-roaming natures.
2. Provide adequate habitat through the principles of multiple-use and environmental protection, while maintaining a thriving ecological balance.
3. Provide opportunities for the public to view wild horses and burros in their natural habitat.
4. Protect wild horses and burros from unauthorized capture, branding, harassment, or death.

III.17.2 Wild Horse and Burro Herd Management

California contains 33 geographic herd areas where wild horses and burros lived when the Wild Free-Roaming Horse and Burro Act was passed in 1971. California's free-roaming wild horses and burros range over 7.1 million acres of BLM-administered land and 2.3 million acres of non-BLM land. The USFS does not have jurisdiction over any wild horse and burro territories in the LUPA Decision Area. In a subset of herd areas, known as herd management areas (HMAs), BLM actively manages wild horse and burro herds. Through its land use plans, BLM identified HMAs suitable for the long-term management of wild horses and burros.

California has 22 HMAs on BLM-administered lands. The BLM's management goal for HMAs is to maintain a thriving ecological balance on these lands. BLM studied each HMA to determine appropriate management levels for its wild horses and burros. This assessment considers other natural resources such as vegetation, wildlife, and other uses including livestock grazing and recreation.

The LUPA Decision Area contains several herd areas and five HMAs (Figure III.17-1). These are listed in Table III.17-1 and described in more detail in sections III.17.2.1 through III.17.2.11.

Table III.17-1
Herd Management Areas and Herd Areas Within the LUPA Decision Area

HMAs and Herd Areas	BLM Acres
Cadiz Valley and Chocolate Mountains Ecoregion Subarea	
Chemehuevi HMA	12,500
Chocolate–Mule Mountains HMA	128,000
Herd Areas (Chemehuevi, Chocolate–Mule Mountains, and Picacho)	386,000
Total	**565,500**
Imperial Borrego Valley Ecoregion Subarea	
Chocolate–Mule Mountains HMA	66,000
Herd Areas (Chocolate–Mule Mountains and Picacho)	81,000
Total	**147,000**
Kingston and Funeral Mountains Ecoregion Subarea	
Chicago Valley HMA	258,000
Herd Areas (Chicago Valley, Clark Mountain, and Lava Beds)	475,000
Total	**733,000**
Mojave and Silurian Valley Ecoregion Subarea	
HMAs	0
Herd Areas (Lava Beds and Slate Range)	21,000
Total	**21,000**
Owens River Valley Ecoregion Subarea	
Lee Flat HMA	1,000
Centennial HMA	6,000
Herd Areas (Centennial and Lee Flat)	35,500
Total	**42,500**
Panamint Death Valley Ecoregion Subarea	
HMAs	0
Herd Areas (Centennial, Panamint, Sand Spring–Last Chance, and Slate Range)	239,000
Total	**239,000**

Table III.17-1
Herd Management Areas and Herd Areas Within the LUPA Decision Area

HMAs and Herd Areas	BLM Acres
Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea	
HMAs	0
Herd Areas (Morongo)	7,000
Total	**7,000**
Piute Valley and Sacramento Mountains Ecoregion Subarea	
Chemehuevi HMA	93,000
Herd Areas (Chemehuevi and Dead Mountain)	339,000
Total	**432,000**
Providence and Bullion Mountains Ecoregion Subarea	
HMAs	0
Herd Areas (Granite–Providence Mountains and Piute Mountain)	43,500
Total	**43,500**
West Mojave and Eastern Slopes Ecoregion Subarea	
HMAs	0
Herd Areas (Centennial and Kramer)	16,500
Total	**16,500**
California Desert Conservation Area Outside the DRECP Boundary	
Centennial HMA	65,000
Lee Flat HMA	71,000
Palm Canyon HMA	2,000
Piper Mountain HMA	86,000
Waucoba-Hunter Mountain HMA	22,000
Herd Areas (Centennial, Coyote Canyon, Lee Flat, Morongo, Palm Canyon, Panamint, Piper Mountain, Sand Spring–Last Chance, and Waucoba–Hunter Mountain)	547,000
Total	**793,000**

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.
Source: BLM 2007 and BLM GIS data 2013

The environmental baseline includes more than 50 renewable energy projects that are either under construction or nearly completed in the DRECP area. These projects are listed in Appendix O and shown in Figure III.1-2a and Figure III.1-2b (Chapter III.1, Section III.1.3.3). There is no overlap between these renewable energy projects and either HMAs or herd areas.

III.17.2.1 Cadiz Valley and Chocolate Mountains Ecoregion Subarea

The Cadiz Valley and Chocolate Mountains ecoregion subarea contains a large portion of the Chocolate–Mule Mountains HMA, a small portion of the Chemehuevi HMA, and approximately 386,000 acres of herd areas (see Table III.17-1 and Figure III.17-1). The Chemehuevi HMA, in eastern San Bernardino County, covers an area from 7 miles south of Needles, California, to the Parker Dam on the Colorado River, and stretches east of U.S. Route 95 eastward to the Colorado River. As of 2012, this HMA contained approximately 108 wild burros. The Chemehuevi HMA consists of 79,000 acres; approximately 12,500 acres are within BLM-managed lands in the LUPA Decision Area (BLM 2007).

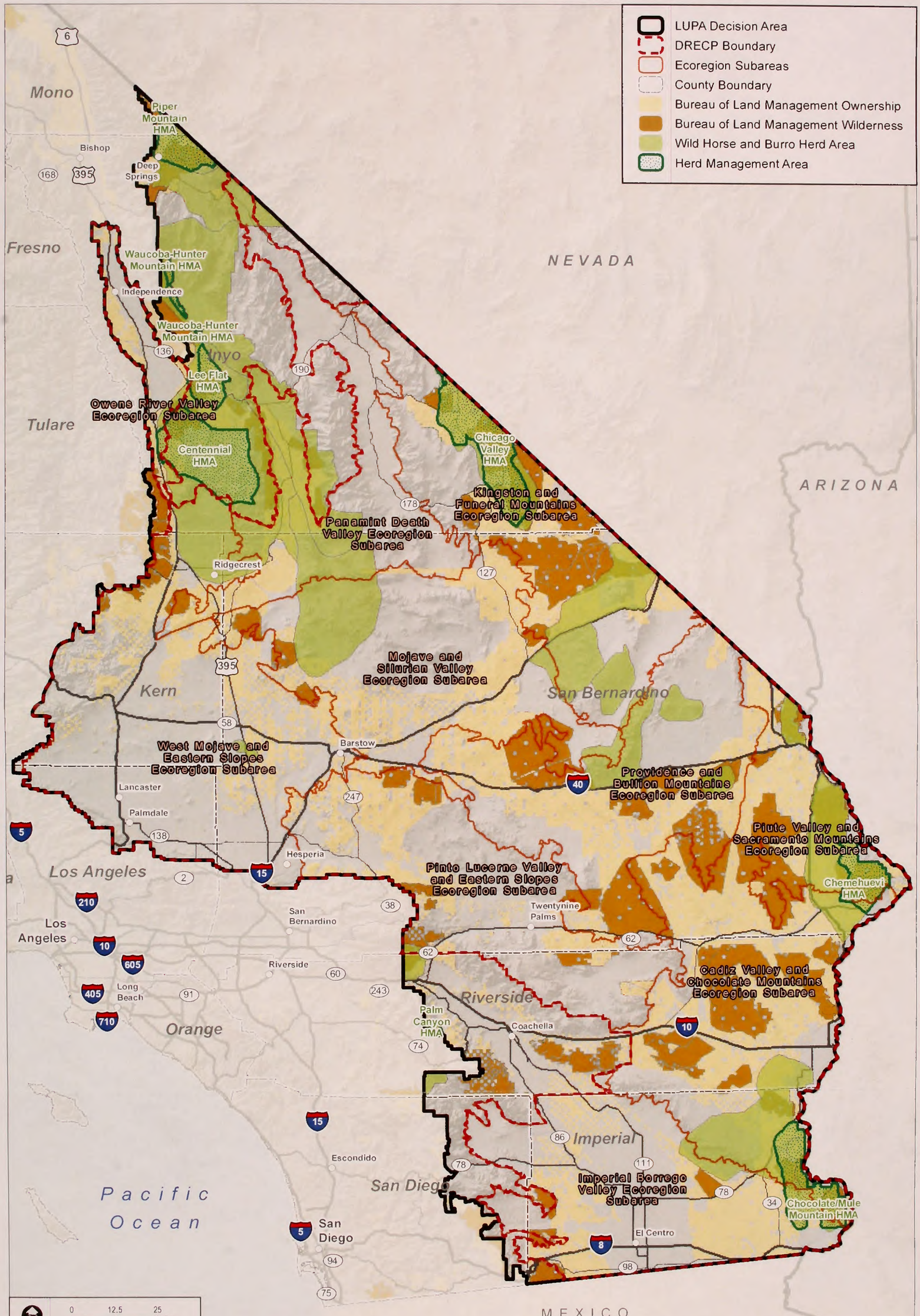
The Chocolate–Mule Mountains HMA is in southeastern Imperial County, along the Colorado River bordering the Picacho State Recreation Area west of Yuma, Arizona (see Figure III.17-1). As of 2012, this HMA contained 121 wild burros. The burros in these areas are believed to originate from mining operations in the 1800s. With introduction of the railroad and abandonment of the mines, miners abandoned their animals into the foothills (BLM 2012[a] and 2012[b]). The Chocolate–Mule Mountains herd area and the Cibola-Trigo HMA were combined and reduced under the Northern and Eastern Colorado Desert California Desert Conservation Area (CDCA) and are now called the Chocolate-Mule Mountains HMA. This HMA encompasses 159,000 acres; approximately 128,000 acres are within BLM-managed lands in the LUPA Decision Area (BLM 2007).

III.17.2.2 Imperial Borrego Valley Ecoregion Subarea

The Imperial Borrego Valley ecoregion subarea contains approximately 66,000 acres of the Chocolate-Mule Mountains HMA, as well as approximately 81,000 acres of herd areas (see Table III.17-1 and Figure III.17-1). The Chocolate-Mule Mountains HMA is described in Section III.17.2.1, Cadiz Valley and Chocolate Mountains Ecoregion Subarea.

III.17.2.3 Kingston and Funeral Mountains Ecoregion Subarea

The Kingston and Funeral Mountains ecoregion subarea contains the Chicago Valley HMA as well as approximately 475,000 acres of herd areas (see Table III.17-1 and Figure III.17-1). The Chicago Valley HMA is in southeastern Inyo County along the California-Nevada border near Death Valley Junction. This HMA consists of approximately 278,000 acres managed for wild horses, approximately 258,000 acres of which are within BLM-managed lands in the LUPA Decision Area. As of 2012, this HMA contained 12 wild horses. The horses in this area are believed to originate from ranching operations (BLM 2012[c]).



Sources: ESRI (2014); BLM (2015); RECON (2015)

FIGURE III.17-1

Wild Horse and Burro Herd Areas and Herd Management Areas within the LUPA Decision Area

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III.17.2.4 Mojave and Silurian Valley Ecoregion Subarea

The Mojave and Silurian Valley ecoregion subarea contains approximately 21,000 acres of herd areas and no HMAs (see Table III.17-1 and Figure III.17-1).

III.17.2.5 Owens River Valley Ecoregion Subarea

The Owens River Valley ecoregion subarea contains small portions of both the Lee Flat and Centennial HMAs and approximately 35,500 acres of herd areas. The Lee Flat HMA is east of the dry Owens Lake bed in Inyo County (see Table III.17-1 and Figure III.17-1). In this HMA, a total of 73,000 acres is managed for wild burros even though there were no wild burros in this HMA as of 2012. As a result of the California Desert Protection Act of 1994, Death Valley National Park acquired 45% of the Lee Flat HMA, which contained permanent, reliable water sources for burros. The National Park Service, which now administers the area, removed the burros in the early 2000s. The wild burros in this area are believed to originate from mining operations in the mid-1800s (BLM 2012[d]). Approximately 1,000 acres of the Lee Flat HMA are within BLM-managed lands in the LUPA Decision Area.

The Centennial HMA is in Kern County, approximately 10 miles north of Ridgecrest, California (see Table III.17-1 and Figure III.17-1). This HMA consists of 319,000 acres managed for wild horses. As of 2012, this HMA contained 400 wild horses and 180 burros. Approximately 6,000 acres of the Centennial HMA are within BLM-managed lands in the LUPA Decision Area. The horses in this area are believed to originate from ranching operations (BLM 2012[e]).

III.17.2.6 Panamint Death Valley Ecoregion Subarea

The Panamint Death Valley ecoregion subarea contains approximately 239,000 acres of herd areas and no HMAs (see Table III.17-1 and Figure III.17-1).

III.17.2.7 Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

The Pinto Lucerne Valley and Eastern Slopes ecoregion subarea contains approximately 7,000 acres of herd area and no HMAs (see Table III.17-1 and Figure III.17-1).

III.17.2.8 Piute Valley and Sacramento Mountains Ecoregion Subarea

The Piute Valley and Sacramento Mountains ecoregion subarea contains a large portion of the Chemehuevi HMA as well as approximately 339,000 acres of herd areas (see Table III.17-1 and Figure III.17-1). The Chemehuevi HMA is described in more detail in Section III.17.2.1. Approximately 93,000 acres of the Chemehuevi HMA are within BLM-managed lands in the LUPA Decision Area.

III.17.2.9 Providence and Bullion Mountains Ecoregion Subarea

The Providence and Bullion Mountains ecoregion subarea contains approximately 43,500 acres of herd areas and no HMAs (see Table III.17-1 and Figure III.17-1).

III.17.2.10 West Mojave and Eastern Slopes Ecoregion Subarea

The West Mojave and Eastern Slopes ecoregion subarea contains approximately 16,500 acres of herd areas and no HMAs (see Table III.17-1 and Figure III.17-1).

III.17.2.11 CDCA Area Outside the DRECP Boundary

The CDCA Area outside the DRECP boundary contains all or portions of five HMAs and nine herd areas, the majority in the northern area in Inyo County. There are approximately 547,000 acres of wild horse and burro herd areas and approximately 246,000 acres of HMAs in the CDCA area outside the DRECP boundary (see Table III.17-1 and Figure III.17-1).

The Centennial and Lee Flat HMAs are described in more detail in Section III.17.2.5. The Palm Canyon HMA is in Riverside County, California (see Table III.17-1 and Figure III.17-1). This HMA consists of 9,500 acres managed for wild horses. As of 2012, this HMA contained six wild horses. Approximately 2,000 acres of the Palm Canyon HMA are within BLM-managed lands in the LUPA Decision Area. The horses in this HMA likely originated from historical ranching stock (BLM 2012[f]).

The Piper Mountain HMA is in Inyo County approximately 20 miles east of Bishop, California (see Table III.17-1 and Figure III.17-1). This HMA consists of 86,000 acres managed for wild horses and wild burros. As of 2012, this HMA contained 17 wild horses and 82 burros. The approximate 86,000-acre Piper Mountain HMA is within BLM-managed lands in the LUPA Decision Area. The horses in this area likely originated from historical ranching stock. The burros are thought to have been abandoned in the mid-1800s when mining operations began to fail (BLM 2012[g]).

The Waucoba–Hunter Mountain HMA is in southern Inyo County approximately 30 miles east of Olancha, California (see Table III.17-1 and Figure III.17-1). This HMA consists of 23,000 acres managed for wild burros. As of 2012, this HMA contained 11 wild burros. Approximately 22,000 acres of the Waucoba–Hunter Mountain HMA are within BLM-managed lands in the LUPA Decision Area. The burros in this area are thought to have been abandoned in the mid-1800s when mining operations began to fail (BLM 2012[h]).

III.17.3 Transmission Outside the DRECP Area

The transmission corridors outside the DRECP area generally fall into four geographic areas: San Diego, Los Angeles, North Palm Springs–Riverside County, and the central California Valley. This setting includes designated HMAs and herd areas for wild horses and burros within 1.5 miles of the center of transmission corridors, or a 3-mile-wide swath. The 3-mile-wide swath was chosen to conservatively account for potential deviations on the route.

The transmission corridors in the Los Angeles, San Diego, and Central Valley areas do not include either HMAs or herd areas. In the North Palm Springs–Riverside area, two HMA/herd areas are within a 3-mile-wide swath of the transmission corridors. The Morongo herd area would be traversed for approximately 4 miles, and the Palm Canyon HMA and herd area would be within approximately 1.5 miles of a transmission corridor under Alternative 2 (BLM 2013).

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III.18 OUTDOOR RECREATION

This chapter presents the regulatory setting that guides the management of recreation resources. It also describes the existing outdoor recreation environment within the Bureau of Land Management (BLM) Land Use Plan Amendment (LUPA) Decision Area, which encompasses the Desert Renewable Energy Conservation Plan (DRECP) area and the California Desert Conservation Area (CDCA).

The Mojave and Sonoran deserts in California attract millions of visitors each year. These deserts offer many motorized and nonmotorized recreational opportunities such as backcountry touring, backpacking, camping, hiking, bicycling, geocaching, hang gliding, hunting, land sailing, off-highway vehicle (OHV) riding, photography, rock climbing, sport shooting, stargazing, wildflower viewing, and wildlife watching.

Many of these activities are available on BLM lands in the CDCA and DRECP areas. In 2010, more than 10 million visitors participated in one or more of these activities on BLM-administered lands in California (BLM 2011). Specifically, OHV recreation has been and continues to be a popular activity in the LUPA Decision Area. OHV recreation ranges from local and casual recreation to organized and well-funded competitive off-road racing (Randall et al. 2010). Motorized backcountry recreation typically involves OHV or four-wheel-drive travel to remote areas for recreational purposes such as dispersed camping, hiking, rock hounding, motorized touring, hunting, and fishing.

Recreational visits on National Park Service (NPS) lands within the DRECP area average about 3.7 million per year (NPS 2012). Recreational opportunities in national parks include sightseeing, vehicle touring, hiking, bird watching, wildlife viewing, photography, stargazing, camping, horseback riding, running, bicycling, and backpacking.

Visitor attendance at California's state parks was over 63 million in fiscal year 2010-2011 (California Department of Parks and Recreation [California State Parks] 2011). As with federal recreation lands, many factors affect visits to state parks. During peak seasons when conditions are most favorable, many parks, especially campgrounds, reach capacity; during off-peak seasons, demand is less.

Federal and state plans, including the CDCA plan, BLM resource management plans, NPS general management plans, and California State Parks general plans describe outdoor recreation management, areas, and activities within the LUPA Decision Area. The BLM's geothermal and wind programmatic environmental impact statements also discuss outdoor recreation in California. The following sections discuss the federal and state lands available for recreation within the LUPA Decision Area.

III.18.1 Regulatory Setting

III.18.1.1 Federal

Many BLM regulations pertinent to recreation are found in other chapters of this DRECP Proposed LUPA and Final EIS. The BLM's multiple-use classes include a discussion about the types and intensity of outdoor recreation allowed on BLM-administered lands within the CDCA and are described elsewhere in Volume III (see Chapter III.14, BLM Land Designations, Classifications, Allocations, and Lands With Wilderness Characteristics). Regulations pertinent to National Scenic and Historic Trails are also discussed in Sections III.14.1.5 and III.14.1.13. Regulations related to Wild and Scenic River designations are further described in Section III.14.1.4. Multiple-use classes relating to BLM routes of travel and national trails are described later in this chapter (see Section III.18.2.1.3, Off-Highway Vehicle Areas).

The management of NPS is guided by the Constitution, public laws, treaties, proclamations, executive orders, regulations, and directives of the Secretary of the Department of the Interior and the assistant secretaries for the U.S. Fish and Wildlife Service and NPS. The NPS Organic Act, passed by Congress in 1916, provides fundamental management direction for all units of NPS. A key management provision in the act is:

> "[The National Park Service] shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations . . . by such means and measure as conform to the fundamental purpose of said parks, monuments and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."

Congress amended the Organic Act with the 1970 General Authorities Act (16 United States Code 1[a] – 1 et seq.), which affirms that all of the nation's parks—whether they include natural, cultural, or historic resources—are united under the mission, purpose, and protection of the Organic Act. The 1978 Redwood National Park Expansion Act amended the Organic Act, re-affirming its mandate and directing NPS to manage federal park lands in a manner that would not degrade park values.

Federal Land Policy and Management Act, 1976 (Public Law 94-579)

The Federal Land Policy and Management Act requires BLM to manage public lands in a manner that will (1) protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values; (2) where appropriate, preserve and protect certain public lands in their natural condition; (3)

provide food and habitat for fish, wildlife, and domestic animals; and (4) provide for both outdoor recreation and human occupancy and use by encouraging collaboration and public participation throughout the planning process. In addition, public lands must be managed in a manner that recognizes the nation's need for domestic sources of minerals, food, timber, and fiber.

The Federal Land Policy and Management Act also requires that:

> [T]he use of all California desert resources can and should be provided for in a multiple use and sustained yield management plan to conserve these resources for future generations, and to provide present and future use and enjoyment, particularly outdoor recreation uses, including the use, where appropriate, of off-road recreational vehicles (Title VI. SC1781 Section 601 [a][4]).

The CDCA Plan was developed to fulfill this requirement. Land use plans are the primary mechanism for guiding BLM activities to achieve the agency's mission and goals.

Executive Orders 11644 and 11989, Use of Off-Road Vehicles on Public Lands

Executive Order 11644 and Executive Order 11989, which amended Executive Order 11644, require public land managers "to establish policies and procedures that will ensure that the use of [OHVs] on public lands will be controlled and directed to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands."

Title 43 Code of Federal Regulations 8340

OHV regulations (43 Code of Federal Regulations [CFR] 8340 et seq.) are based largely on Executive Order 11644. This executive order establishes criteria for designating public lands as open, limited, or closed to OHV use and establishes controls governing the use and operation of OHVs in these designated areas. The designation criteria are as follows:

a. Areas and trails shall be located to both minimize damage to soil, watershed, vegetation, air, or other resources and prevent impairment of wilderness suitability.

b. Areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats.

c. Areas and trails shall be located to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.

d. Areas and trails shall not be located in officially designated wilderness areas or primitive areas. Areas and trails shall be located in natural areas only if the authorized officer determines that off-road vehicle use in such locations will not adversely affect their natural, esthetic, scenic, or other values for which the areas are established.

Title 43 Code of Federal Regulations 8340 defines off-road vehicles as:

> "...any motorized vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain, excluding: (1) any nonamphibious registered motorboat; (2) any military, fire, emergency, or law enforcement vehicle while being used for emergency purposes; (3) any vehicle whose use is expressly authorized by the authorized officer, or otherwise officially approved; (4) vehicles in official use; and (5) any combat or combat support vehicle when used in times of national defense emergencies."

This definition effectively establishes regulation on all types of motorized access to public lands. Although the term OHV can conjure an image of motorcycles or all-terrain vehicles used for recreational purposes, the term and its resulting designations also cover all unauthorized forms of motorized travel and access for any reason across public lands. Motorized access in the LUPA Decision Area is an important consideration for the large variety of activities that make up multiple-use management.

National Management Strategy for Motorized Off-Highway Vehicle Use on Public Lands

The BLM's National Management Strategy for Motorized Off-Highway Vehicle Use on Public Lands (2001) is a comprehensive effort to address this significant issue for natural resource management. This BLM document provides a proactive approach to determine and implement better on-the-ground motorized OHV management solutions designed to conserve soil, wildlife, water quality, native vegetation, air quality, heritage resources, and other resources, while providing for appropriate motorized recreational opportunities. It provides agency guidance and offers recommendations for future actions to improve OHV management. This strategy recognizes that OHV use is an acceptable use of public land wherever it is compatible with established resource management objectives.

Presidential Memorandum—America's Great Outdoors, 2010

In 2010, President Barack Obama launched the America's Great Outdoors initiative to develop a "21st Century conservation and recreation strategy." Key goals of the initiative are to:

- Provide quality jobs, career pathways, and service opportunities.
- Enhance recreational access and opportunities.

- Raise awareness of the value and benefits of America's great outdoors.
- Engage young people in conservation and the great outdoors.
- Strengthen the Land and Water Conservation Fund.
- Establish great urban parks and community green spaces.
- Conserve rural working farms, ranches, and forests through partnerships and incentives.
- Conserve and restore federal lands and waters.
- Protect and renew rivers and other waters.

The BLM and other federal agencies are implementing the President's Great Outdoors Initiative.

BLM Instruction Memorandum 2011-004

The BLM's current land use planning handbook (H-1601-1), released in early 2005, includes planning guidance for recreation and visitor services. Instruction Memorandum 2011-004 revised guidance in the handbook to help create a functional, viable recreation land use planning process that is easy to understand and can be consistently implemented throughout BLM-administered lands. The major change under this instruction memorandum established a 3-tier classification for lands used and managed for recreation: Special Recreation Management Areas (SRMAs), Extensive Recreation Management Areas (ERMAs), and Public Lands not Designated as Recreation Management Areas. This new classification replaces the previous 30-year-old 2-tier system that classified all lands as either SRMAs or ERMAs.

Wilderness Act of 1964

The BLM and NPS jointly manage the wilderness lands in the LUPA Decision Area as part of the National Wilderness Preservation System. Wilderness is managed according to the Wilderness Act of 1964 (16 United States Code 1131-1136, 78, Statute at Large 890), the California Desert Protection Act of 1994, the Omnibus Public Lands Management Act of 2009, and regulations for wilderness management (43 Code of Federal Regulations 6300, BLM manuals 8560 and 8561, BLM Handbook H-8560-1, Wilderness Management Plans, NPS Director's Order #41: Wilderness Preservation and Management, NPS Reference Manual 41, and general management plans).

Congress states that wilderness is an area of undeveloped federal land in a natural condition, without permanent improvements or human habitation, which has outstanding opportunities for solitude or a primitive and unconfined type of recreation (Wilderness Act

of 1964 Section 2[c]; public Law 88-577; 16 United States Code 1131-1136). Recreation on wilderness lands is restricted to nonmotorized activities and includes backpacking, hunting, fishing, and horseback riding. Wilderness is further discussed in Chapter III.14 of this DRECP Proposed LUPA and Final EIS.

III.18.1.2 State

California Department of Fish and Wildlife

The mission of the California Department of Fish and Wildlife (CDFW) is to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. This includes habitat protection and maintenance in a sufficient amount and quality to ensure the survival of all species and natural communities. The department is also responsible for the diversified use of fish and wildlife, including recreational uses such as fishing and hunting as regulated under CDFW codes (for additional background see Volume I, Section 1.2.4).

California State Lands Commission

The California State Lands Commission (CSLC) has jurisdiction and management control over certain public lands transferred from the federal government to the State of California. In the LUPA Decision Area, these lands consist primarily of "school lands," which are lands managed by CSLC to produce revenue benefitting public schools. The CSLC also has jurisdiction over "sovereign lands" at Owens Lake and the Colorado River. Sovereign lands are lands the CSLC manages for the benefit of all Californians, subject to the Public Trust Doctrine for water-related commerce, navigation, fisheries, recreation, open space, and other recognized public trust uses. (Find additional background in Volume I, Section I.1.2, and information on laws relevant to CSLC jurisdiction in Section I.2.5.)

California Department of Parks and Recreation

The mission of the California State Parks is to provide for the health, inspiration, and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high-quality outdoor recreation (California State Parks 2010). In addition to the department's mission, the inclusion of a park as a unit in the State Park System recognizes the unit's resources significance and establishes the parameters for park management and appropriate development (California Public Resources Code, Section 5019.50-5019.80).

Following classification or reclassification of a unit by the State Park and Recreation Commission, and prior to the development of any new facilities in any previously classified

unit, regulation requires the department to prepare a general plan or revise any existing plan (Public Resources Code Section 5002.2).

Off-Highway Motor Vehicle Recreation Act of 2003

California's Off-Highway Motor Vehicle Recreation (OHMVR) Act of 2003 (Public Resources Code Section 5090.01 et seq.) supports the addition to and expansion of OHV areas. This act also requires that these recreation areas be managed to sustain them for long-term motor vehicle recreation and that the OHMVR program supports motorized off-highway access to nonmotorized recreation opportunities. The act requires that the OHMVR program be given equal priority with other programs administered by California State Parks. Through the OHMVR act, the California Legislature created a separate division within California State Parks, the OHMVR Division, which has exclusive authority for administering and managing the program.

Off-Highway Motor Vehicle Recreation Program

The OHMVR program addresses both OHV recreation and off-highway motorized access to other forms of recreation by managing and operating eight State Vehicular Recreation Areas (SVRAs) dedicated to motorized recreation and resource conservation and by providing financial assistance grants to state, local, and federal agencies, Native American tribes, nonprofit organizations, and educational institutions that provide OHV opportunities and related maintenance, operation, law enforcement, and environmental conservation services (Public Resources Code Section 5090.02[c]). The goals of the program are as follows:

1. Existing off-highway motor vehicle recreational areas, facilities, and opportunities should be expanded and managed in a manner consistent with this chapter, especially in the maintenance for long-term use.
2. New OHV recreation areas, facilities, and opportunities should be provided and managed in a manner that will sustain their long-term use.
3. The department should support both motorized recreation and motorized off-highway access to nonmotorized recreation.
4. When areas, trails, or portions thereof cannot be maintained to appropriate established standards for sustained long-term use, they should be closed to use and repaired to prevent accelerated erosion. Those areas should remain closed until they can be managed within the soil conservation standard, or should be closed and restored.
5. Prompt and effective implementation of the OHMVR Program by the department and the Division of Off-Highway Motor Vehicle Recreation should have equal priority among other programs within California State Parks.

6. OHV recreation should be managed through financial assistance to local governments and joint undertakings with other U.S. agencies and federally recognized Native American tribes.

III.18.1.3 County

Imperial County

The purpose of the Imperial County Parks and Recreation Element (Imperial County 2008) is to establish a framework for the stewardship of county parks and other recreational amenities. This is an optional element in the Imperial County General Plan but is consistent with other requirements (California Government Code Section 65302). This element applies to all unincorporated land within the county.

Inyo County

The Inyo County General Plan contains seven elements required by state law (Government Code Section 65302). Recreation is discussed in the county's Conservation and Open Space Element (Inyo County 2001).

Kern County

The Kern County General Plan (Kern County 2004) addresses recreation in its Land Use, Open Space, and Conservation Element (Section 1.4) with a combination of required elements (Government Code Section 65302).

Los Angeles County

The Antelope Valley Areawide General Plan (Los Angeles 1986), in conjunction with other chapters and elements of the County of Los Angeles General Plan, is a coordinated statement of public policy for making important public decisions. Recreation policies are further discussed in the General Plan's Community Design and Public Services and Facilities chapter.

Riverside

The Riverside County General Plan (Riverside County 2003) addresses recreation in Chapter 5, Multipurpose Open Space Element. The plan contains policies related to the preservation, use, and development of a comprehensive open space system consisting of passive open space areas, parks, and recreation areas with recreational, ecological, and scenic value.

San Bernardino County

The Open Space Element of the San Bernardino General Plan (San Bernardino County 2007) provides a reference to guide the protection and preservation of open space, recreation, and scenic areas, while accommodating growth within San Bernardino County. Recreation is specifically addressed in Section VI of the General Plan.

County general plans are more fully addressed elsewhere in this volume (see Chapter III.11, Land Use and Policies, Section III.3.3).

III.18.2 Outdoor Recreation Within the DRECP Area

Approximately 10.9 million acres are available for recreation within the DRECP area. In addition, approximately 990,000 acres are available for recreation within the CDCA area outside the DRECP boundary. BLM, NPS, California State Parks, and CDFW manage these lands. The renewable development on BLM lands could result in indirect effects to NPS, California State Parks, and CDFW lands. BLM-managed recreation lands include wilderness, SRMAs, ERMAs, OHV recreation areas, national trails, and National Wild and Scenic Rivers. NPS-managed recreation lands include wilderness, national parks, national preserves, and national trails. California State Parks-managed recreation lands include state parks, state recreation areas, and SVRAs. The following description focuses primarily on the region within the DRECP boundary as the BLM actions outside the DRECP boundary would have minimal effects on recreation.

III.18.2.1 Bureau of Land Management

The BLM manages approximately 10 million acres within the DRECP area, most of which (over 6.7 million acres) is available for recreational use. In addition to wilderness, BLM also manages SRMAs, Areas of Critical Environmental Concern (ACECs) with a recreational component, OHV areas, and areas managed for a recreational emphasis, as well as the Amargosa Wild and Scenic River; these designations and areas generally overlap.

There are numerous opportunities for recreation on BLM-managed lands. Miles of designated routes of travel provide access throughout the DRECP area to all types of recreation opportunities. The BLM CDCA, and Bishop and Caliente resource management plans generally provide for a wide range of quality recreation opportunities and experiences that emphasize dispersed undeveloped use and a minimum of recreation facilities. These opportunities complement the more structured recreation approach on NPS and California State Parks lands.

III.18.2.1.1 Recreation Management Areas

The BLM's Recreation Management Areas, classified as either SRMAs or ERMAs, are land units where Recreation and Visitor Services are the primary resource management consideration and specific management is required to protect recreation opportunities. Where SRMAs overlap with other special management areas, such as ACECs, BLM must include special management for the important and relevant resources within the ACEC. The Recreation Management Area designation is based on recreation demand and issues, recreation characteristics, use/user conflict resolution, compatibility with other resource uses, and resource protection needs. There are no designated ERMAs in the DRECP boundary.

An SRMA designation intensifies management of areas where outdoor recreation is a high priority. SRMAs are units of public land identified for directing available recreation funding and personnel to specific, structured recreation opportunities. SRMAs are managed to protect and enhance a targeted set of activities, experiences, benefits, and desired recreation. SRMAs are areas with high-value recreation resources that attract visitors from one of three recreation markets managed as follows:

- Public lands with a demonstrated community recreation-tourism market would be managed as a Community SRMA. A Community SRMA is managed in collaboration with the local community primarily to benefit local residents.
- Public lands with a demonstrated destination recreation-tourism market would be managed as a Destination SRMA. A Destination SRMA is managed as a regional or national destination through collaborative partnerships.
- Public lands with a demonstrated undeveloped recreation-tourism market would be managed as an Undeveloped SRMA. An Undeveloped SRMA is managed to intentionally maintain dispersed and undeveloped recreation opportunities.

SRMAs may include developed campgrounds, trails, interpretive sites, visitor centers, OHV, Long Term Visitor Areas, and other facilities. SRMAs provide a wide variety of recreation opportunities for both motorized and nonmotorized recreation activities.

Table III.18-1 provides information on the two SRMAs, and Appendix L provides additional detail.

III.18.2.1.2 Other Areas Managed for a Recreation Emphasis

The BLM manages many other areas with a recreational emphasis within the CDCA. The areas are "limited" vehicle access areas in the intensive, moderate, and limited multiple-use classes. For these recreation-emphasis areas, management varies on a case-by-case basis, depending on their multiple-use classes, resource values, and area specific management plans. Table III.18-1 provides information on these areas. Appendix L provides additional detail for proposed SRMAs and ERMAs.

Table III.18-1
BLM Special Recreation Management Areas and Other Areas With a Recreation Emphasis Within the DRECP Area

Name	Ecoregion Subarea	Activities
Afton Canyon (43,000 acres)	Mojave and Silurian Valley Providence and Bullion Mountains	Camping, river play, hiking, historic Mojave Road touring, equestrian riding, bird watching, wildlife viewing, photography, nature study, rock collecting, scenic touring, 4x4 exploration, geocaching, and hunting
Alabama Hills SRMA (28,800 acres)	Owens River Valley	Camping, wildlife viewing, rock climbing, sightseeing, hunting, fishing, horseback riding, scenic touring, picnicking, photography, wildflower viewing, hiking, mountain biking, jogging, running, walking, stargazing, and equestrian use
Amargosa/ Grimshaw (49,000 acres)	Kingston and Funeral Mountains Mojave and Silurian Valley	Hiking, running, equestrian use, bike touring, mountain biking, 4x4 exploration, scenic touring, bird watching, photography, stargazing, geocaching, rock collecting, and picnicking
Amboy Crater (700 acres)	Providence and Bullion Mountains	Hiking, picnicking, photography
Chemehuevi Wash (24,000 acres)	Piute Valley and Sacramento Mountains	Backcountry touring, hiking, rock hounding, camping
Dumont Dunes (77,000 acres)	Kingston and Funeral Mountains	Motorized vehicle riding, camping, scenic touring, trail riding, dune play, photography, hiking, wildflower viewing, picnicking, and exploring historic ruins
Eastern Riverside	Piute Valley and Sacramento Mountains	Camping, hunting, OHV riding, rock hounding, and scenic viewing
Eastern Sierra (87,000 acres)	Owens River Valley West Mojave and Eastern Slopes	Picnicking, camping, hunting, hiking and backpacking, horseback riding, rock climbing, bird watching, wildflower viewing, mountain biking, and scenic vehicle touring. Each year Sand Canyon provides a unique outdoor classroom for fourth graders in the Ridgecrest area, through the Sand Canyon Environmental Education Program.
El Mirage (25,000 acres)	West Mojave and Eastern Slopes	OHV riding, camping, and competitive racing. The Southern California Timing Association has used the lakebed for timed speed runs.
El Paso Mountains (146,000 acres)	Mojave and Silurian Valley Panamint Death Valley West Mojave and Eastern Slopes	Motorized recreation touring, trail riding, hiking, hunting, rock hounding, mountain biking, equestrian use, wildlife viewing, wildflower viewing, sightseeing, photography, picnicking, stargazing, and competitive mountain bike races

Table III.18-1
BLM Special Recreation Management Areas and Other Areas With a Recreation Emphasis Within the DRECP Area

Name	Ecoregion Subarea	Activities
Imperial Sand Dunes SRMA (164,000 acres)	Imperial Borrego Valley	OHV riding, backpacking, camping, road bicycling, hiking, equestrian use, photography, picnicking, and wildlife viewing
Inyo Mountains (6,000 acres)	Owens River Valley	Hiking, camping, hunting fishing, horseback riding
Johnson (389,000 acres – includes acreage for Stoddard as well)	Mojave and Silurian Valley Pinto Lucerne Valley and Eastern Slopes West Mojave and Eastern Slopes	OHV riding, rock climbing, camping, hiking, mountain climbing, equestrian use, geocaching, mountain bike riding, stargazing, photography, hunting, picnicking, and scenic touring
Rademacher Hills Trail (4,000 acres)	Panamint Death Valley West Mojave and Eastern Slopes	hiking, jogging, horseback riding and mountain biking
Rand Mountain (117,000 acres)	Mojave and Silurian Valley West Mojave and Eastern Slopes	Motorized recreation touring, trail riding, camping, hiking, photography, hunting
Rasor (25,000 acres)	Mojave and Silurian Valley	Motorized recreation touring, trail riding, camping, and OHV and 4x4 scenic touring
Red Mountain (273,000 acres)	Mojave and Silurian Valley Panamint Death Valley West Mojave and Eastern Slopes	Motorized recreation touring, hiking, mountain biking, equestrian use, wildlife viewing, wildflower viewing, sightseeing, hunting, photography, picnicking, stargazing, rock hounding, windsurfing, and competitive mountain bike and motorized races. Overnight area for the historic Death Valley Equestrian Ride
Southern Sierra (315,000 acres)	West Mojave and Eastern Slopes	Scenic touring, camping, hiking, equestrian use, OHV trail riding, photography, picnicking,
Stoddard (see acreage above under Johnson)	Mojave and Silurian Valley Pinto Lucerne Valley and Eastern Slopes West Mojave and Eastern Slopes	OHV riding, rock climbing, camping, hiking, mountain climbing, equestrian use, geocaching, mountain bike riding, stargazing, photography, hunting, picnicking, and scenic touring

Table III.18-1
BLM Special Recreation Management Areas and Other Areas With a Recreation Emphasis Within the DRECP Area

Name	Ecoregion Subarea	Activities
Superior/Rainbow (160,000 acres)	Mojave and Silurian Valley West Mojave and Eastern Slopes	Scenic touring, camping, hiking, equestrian use, OHV trail riding, photography, picnicking, geocaching, and stargazing
Yuha Desert/West Mesa (354,000 acres)	Imperial Borrego Valley	OHV trail riding, hunting, hiking, rock and mineral collecting, and camping; as well as site-seeing in areas of interest such as at the Yuha Well, Yuha Shell Beds, and the Crucifixion Thorn Natural Area

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

III.18.2.1.3 Off-Highway Vehicle Areas

OHV areas are BLM-managed lands designated and managed primarily for OHV recreation. All public land within the CDCA Area and the Bakersfield Field Office are designated as open, closed, or limited for vehicle use. On lands designated as open, motorized vehicles may be operated anywhere a vehicle can go within the boundaries of the open area. Within limited use areas, motorized vehicle travel is restricted to the existing road and trail network, and all cross-country travel is prohibited. Limited areas are managed consistent with their multiple-use class of intensive, moderate, or limited. Within open areas, sensitive areas may be closed or have limited through access to protect their sensitive natural and cultural resources. These areas are small and do not make up substantial acreage within the open area. OHV recreation occurs in open and limited use areas. Vehicle travel in limited use areas is allowed on approved and designated routes of travel. Cross-country vehicle travel is generally not allowed in limited use areas; additional restrictions such as vehicle type or season of use may also apply. The majority of BLM-administered lands in the LUPA Decision Area are designated limited use. Existing OHV open areas within the DRECP area are shown in Table III.18-2. Some of the OHV open areas are also presented in Table III.18-1 as SRMAs and other areas managed for recreation emphasis.

Table III.18-2
Off-Highway Vehicle Open and Limited Areas on BLM Land Within the DRECP Area

Name	Ecoregion Subarea	Activities
Arroyo Salado	Imperial Borrego Valley	OHV recreation and primitive camping. Public lands in the area are interspersed with private property. While the lands administered by the BLM are open to cross-country OHV travel, permission must be obtained from private landowners before operating vehicles on their property.
Dove Springs	West Mojave and Eastern Slopes	OHV recreation and primitive camping
Dumont Dunes	Kingston and Funeral Mountains	Motorized vehicle riding, camping, scenic touring, trail riding, dune play, photography, hiking, wildflower viewing, picnicking, and exploring historic ruins
El Mirage	West Mojave and Eastern Slopes	OHV riding, camping, and competitive racing
Imperial Sand Dunes	Imperial Borrego Valley	OHV riding, backpacking, camping, road bicycling, hiking, equestrian use, photography, picnicking, and wildlife viewing
Jawbone	West Mojave and Eastern Slopes	OHV recreation and primitive camping
Johnson Valley	Piute Valley and Sacramento Mountains	Auto touring, camping, OHV riding, wildlife viewing.
Olancha Dunes	Owens River Valley	OHV recreation and primitive camping
Plaster City	Imperial Borrego Valley	OHV recreation and primitive camping.
Rasor	Mojave and Silurian Valley	Motorized recreation touring, trail riding, camping, and OHV and 4x4 scenic touring
Spangler Hills	Mojave and Silurian Valley	OHV recreation and primitive camping
Stoddard Valley	Pinto Lucerne Valley and Eastern Slopes	OHV recreation and primitive camping
Superstition Mountains	Imperial Borrego Valley	OHV recreation and primitive camping

III.18.2.2 National, State, and Local Recreation Areas

Renewable energy development could have indirect effects on national, state, and local parks. The following provides an overview of these resources within the DRECP area.

III.18.2.2.1 National Park Service

The NPS manages approximately 3.8 million acres within the DRECP area, including wilderness lands, Mojave National Preserve, Joshua Tree and Death Valley national parks, and Manzanar National Historic Site. Over 3.7 million visitors per year come to these NPS

lands to hike, camp, and experience outstanding scenery, natural and historic resources, wildlife, and other NPS resources (Chapter III.11). The Old Spanish and Juan Bautista de Anza National Historic Trails, administered by the NPS, also provide outdoor recreation opportunities.

Mojave National Preserve

At 1.6 million acres, Mojave National Preserve is the third-largest unit in the NPS in the contiguous United States. The preserve was established on October 31, 1994, with passage of the California Desert Protection Act. Mojave contains several diverse mountain ranges, the Kelso Dune system, dry lakebeds, and evidence of volcanic activity (domes, lava flows, and cinder cones). Plant and animal life complement the geological features. Mojave contains the largest Joshua tree forest in the world. Providence Mountain State Recreation Area (Mitchell Caverns), the University of California's Granite Mountains Nature Reserve, and California State University's Soda Springs Desert Studies Center are also within the park boundaries. The preserve was established to protect the natural, scenic, and cultural resources within the park and provide opportunities for compatible outdoor recreation. The preserve recorded approximately 536,000 visitors in 2011 (Street 2012).

Joshua Tree National Park

As part of the California Desert Protection Act, Joshua Tree National Monument was elevated to park status on October 31, 1994. The bill also added 234,000 acres. Of the park's current 793,000 acres, over 591,000 are designated as wilderness. Joshua Tree provides habitat for 813 higher plant species, 40 reptile species, 41 mammal species, and 240 bird species. The park also protects over 700 archeological sites, 88 historic structures, and 19 cultural landscapes and houses 230,300 items in its museum collection. The park contains 9 campgrounds with 523 campsites and 2 horse camps, and 10 picnic areas with 38 picnic sites. There are 32 trailheads and 191 miles of hiking trails throughout the park. There were approximately 1.4 million visitors in 2011 (Street 2012).

Death Valley National Park

President Herbert Hoover proclaimed a national monument in and around Death Valley on February 11, 1933. On October 31, 1994, the monument was expanded by 1.3 million acres and redesignated a national park with passage of the California Desert Protection Act. Death Valley National Park covers a vast area with over 3 million acres of designated wilderness and hundreds of miles of backcountry roads. The park offers opportunities for hiking, camping, wildlife viewing, horseback riding, off-road touring, and mountain biking. The park recorded approximately 946,000 visitors in 2011 (Street 2012).

Manzanar National Historic Site

Manzanar National Historic Site was established in 1992 to preserve the history of the internment of nearly 120,000 Japanese-Americans during World War II (Public Law 102–248; 106 Statutes at Large 40). Located at the foot of the Sierra Nevada in Owens Valley between the towns of Lone Pine to the south and Independence to the north, Manzanar is approximately 230 miles northeast of Los Angeles. The site features restored sentry posts at the camp entrance, a replica of a camp guard tower, staff or self-guided tours, informational markers, and other educational programs. There were approximately 80,000 visitors to the site in 2011 (Street 2012).

Juan Bautista de Anza National Historic Trail

Approximately 83 miles of the 1,210-mile (in Arizona and California) Juan Bautista de Anza National Historic Trail historic corridor alignment are in the DRECP area, in the Imperial Borrego Valley ecoregion subarea. A portion of the trail is located on BLM-administered land. The trail commemorates the 1775-1776 Spanish Expedition, whose members traveled this route from Mexico to the San Francisco Bay Area. The Anza Historic Trail Plan identifies several segments of the Anza Recreation Trail in addition to the signed, continuous auto route within or near the trail management corridor within the Imperial Borrego Valley ecoregion subarea of the DRECP. Ideally the recreation trail would follow the historic corridor but in some instances this is infeasible.

Old Spanish National Historic Trail

Approximately 367 miles of the Old Spanish National Historic Trail are within the DRECP area and cross six ecoregion subareas. A portion of the trail is located on BLM-administered land. The various route alignments of this historic trail network were historically a combination of indigenous peoples' paths and the horse and mule exploration and trade routes used to transport merchandise and people in the early 1800s. The Old Spanish National Historic Trail is not a constructed contiguous trail with a demarcated alignment, and there are very few officially designated hiking trails along the trail corridor.

III.18.2.2.2 State of California

The State of California manages over 1 million acres within the DRECP area, and about a third is available for recreational use. Of this total, California State Parks manages over 332,000 acres, and CDFW manages over 43,000 acres. These recreation lands are discussed in the following sections. State-managed lands are also discussed elsewhere in this volume (Chapter III.11).

California Department of Parks and Recreation

Many important state parks, state recreation areas, and SVRAs are within the DRECP area. The following paragraphs describe the major facilities.

State Parks

California State Parks administers approximately 1.3% of the DRECP area (292,790 acres) as state parks or as other units within its system, as shown in Table III.18-3.

Table III.18-3
California State Parks Lands Within the DRECP Area

California State Parks Unit	Acres Within the DRECP Area
Antelope Valley California Poppy Reserve	2,000
Antelope Valley State Historic Park Indian Museum	200
Anza-Borrego Desert State Park	210,000
Arthur B. Ripley Desert Woodland State Park	600
Heber Dunes SVRA	500
Ocotillo Wells SVRA	50,000
Picacho State Recreation Area	600
Providence Mountains State Recreation Area, includes Mitchell Caverns	6,000
Red Rock Canyon State Park	19,000
Saddleback Butte State Park	3,000
Salton Sea State Recreation Area	500
Tomo–Kahni State Historic Park	600
Total	**293,000**

Notes: All acreages derived from best available data.
The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

Following are descriptions of the largest state parks within the DRECP area.

Anza-Borrego Desert State Park. Anza-Borrego takes its name from both the eighteenth century Spanish explorer Juan Bautista de Anza and "borrego," the Spanish word for bighorn sheep. The park occupies eastern San Diego County and reaches into Imperial and Riverside counties, containing two communities: Borrego Springs (home of the park headquarters) and Shelter Valley. With 600,000 acres, it is the largest state park in California. Anza-Borrego Desert State Park includes 500 miles of dirt roads, 12 designated

wilderness areas, and 110 miles of hiking trails that provide visitors with many opportunities to experience the park's unique version of the Colorado Desert environment.

Red Rock Canyon State Park. Red Rock Canyon State Park occupies approximately 27,000 acres within the Mojave Sector of the Tehachapi District of the California State Park System and lies at the southernmost tip of the Sierra Nevada where it converges with the El Paso Range. The park is approximately 25 miles northeast of Mojave and 80 miles east of Bakersfield in Kern County. It features various desert cliffs, buttes, and rock formations. The area was once home to the Kawaiisu Indians, who left petroglyphs in the El Paso Mountains and other evidence of their inhabitation. The park now protects significant paleontological sites and the remains of 1890s-era mining operations. The park includes two natural preserves and provides recreation activities, camping, sightseeing, horseback riding, hiking, and opportunities for reflection and solitude.

Antelope Valley Indian Museum State Park. Antelope Valley Indian Museum State Park is California's State Regional Indian Museum and represents Great Basin Indian cultures. The exhibits and interpretive displays emphasize American Indian groups (both aboriginal and contemporary) of the Southwest, Great Basin, and California culture regions; Antelope Valley was once a major prehistoric trade corridor linking all three of these culture regions. Next to the museum is a self-guided nature trail, a picnic area, and an outdoor ceremonial arena. Occasionally guest Indian groups perform traditional dances and offer other programs. The museum is in northeastern Los Angeles County, 19 miles east of State Route (SR) 14 in Lancaster.

Tomo-Kahni State Historic Park. Tomo-Kahni State Historic Park became a California State Park in 1993 to protect and preserve the integrity of this unique site. Located atop a ridge in the Tehachapi Mountains, overlooking Sand Canyon to the east and the Tehachapi Valley to the west, Tomo-Kahni, or "Winter Village," was the site of a Kawaiisu (Nuwa) village. Because of the extremely sensitive nature of the site, Tomo-Kahni is available to the public by tour only.

Arthur B. Ripley Desert Woodland State Park. Added to the state park system in 1988, this park was donated to the state by late screenwriter Arthur "Archie" Ripley. The park protects and preserves an impressive stand of native Joshua trees and junipers, which once grew in great abundance throughout the valley. Today, only remnant parcels of this majestic woodland community remain, the rest long ago cleared for farming and housing. The park features a picnic table and self-guided nature trail, with information about desert wildflowers and animals. The park is approximately 7 miles west of the Antelope Valley California Poppy Reserve near Lancaster.

Antelope Valley California Poppy Reserve. Antelope Valley California Poppy Reserve, just west of Lancaster, contains 8 miles of trails through the gently rolling hills, including a paved section for wheelchair access. The park is known for its intense wildflower blooming, from as early as mid-February through late May. The Jane S. Pinheiro Interpretive Center, offering a short video, wildlife and plant displays, and a gift shop, is open during the wildflower season. Shaded picnic tables nearby are available on a first-come, first-served basis year-round, with an interpretive display and a serene view over the valley to the San Gabriel Mountains.

State Recreation Areas

There are three state recreation areas within the DRECP area. Salton Sea State Recreation Area covers 14 miles of the northeastern shore and provides recreation opportunities for kayakers, campers, boaters, anglers, birdwatchers, photographers, and hikers. Picacho State Recreation Area is popular with boaters, hikers, anglers, and campers. Providence Mountains State Recreation Area is currently closed to the public.

State Vehicular Recreation Areas

SVRAs are established to provide the fullest public use of quality OHV recreation areas while meeting soil and wildlife protection standards. There are two SVRAs within the DRECP area: Heber Dunes and Ocotillo Wells.

Heber Dunes SVRA is in the southern Imperial Valley, approximately 10 miles southeast of El Centro and 2 miles north of the Mexico border in Imperial County. Although Heber Dunes SVRA is a relatively small park, it fulfills an important local recreational need and is where many families gather to picnic and socialize (California State Parks 2011).

Ocotillo Wells SVRA is the largest of the SVRAs. This SVRA is near the Salton Sea and covers portions of San Diego and Imperial counties. Ocotillo Wells SVRA offers a wide range of opportunities for OHV recreation and exploration, as well as hiking, biking, geocaching, and camping (California State Parks 2011).

California Department of Fish and Wildlife

CDFW manages approximately 55,000 acres of lands within the DRECP, of which 43,615 acres are managed for recreation. Recreation opportunities on CDFW lands (public access, ecological reserve, and wildlife areas) primarily include hunting, fishing, and wildlife viewing.

The ecological reserves make a significant contribution to the conservation of California's biological diversity by protecting important species populations and habitats, some found nowhere else. They also provide educational and recreational opportunities for wildlife

viewing, nature walking, and fishing in areas where these activities have no adverse effects on wildlife and habitats. The ecological reserves within the DRECP area include:

- Baldwin Lake
- By Day Creek
- Carrizo Canyon
- Coachella Valley
- Estelle Mountain
- Fish Slough
- Indian Joe Spring
- King Clone
- Magnesia Spring
- Oasis Spring
- Palo Verde
- Peninsular Ranges
- Piute Creek
- River Springs Lakes
- Saline Valley
- San Felipe Creek
- Santa Rosa Plateau
- Sky Valley
- Sycamore Canyon
- West Mojave Desert

CDFW acquires wildlife areas to protect and enhance habitat for wildlife and to provide for public uses that are compatible with the long-term well-being of wildlife and habitat. Management of these areas ranges from custodial care, where the goal is to protect the area from destructive activities, to annual intensive habitat manipulation to maximize wildlife populations. CDFW wildlife areas within the DRECP area include:

- Buttermilk Country
- Camp Cady
- Cartago
- East Walker River
- French Valley
- Green Creek
- Imperial
- Kelso Peak and Old Dad Mountains
- Marble Mountains
- Pickel Meadow
- San Jacinto
- Santa Rosa
- Slinkard/Little Antelope
- West Walker River

III.18.2.2.3 County Parks and Recreation

Selected county park facilities are presented in Table III.18-4.

Table III.18-4
County Parks and Campgrounds

Imperial County Parks	
Sunbeam Lake Wiest Lake	Red Hill Park Palo Verde Park

Table III.18-4
County Parks and Campgrounds

Inyo County	
Campgrounds	*Parks*
Diaz Lake Portagee Joe Independence Creek Taboose Creek Tinnemaha Creek Baker Creek Millpond Pleasant Valley Glacier View Brown's Town Tecopa Park and Campground	Millpond Recreation Area, Bishop Izaak Walton Park, Bishop Starlite Park, Bishop Mendenhall Park, Big Pine Dehy Park, Independence Independence Park, Independence Lone Pine Park, Lone Pine
Kern County Parks	**Los Angeles County Parks**
Tehachapi Mountain Park	Vasquez Rocks Natural Area Phacelia Wildlife Sanctuary Butte Valley Wildlife Sanctuary Big Rock Wash Wildlife Sanctuary Gerhardy Wildlife Sanctuary
Riverside County	**San Bernardino County**
McIntyre Park Goose Flats Wildlife Area Mayflower Park	Moab Regional Park Calico Ghost Town Mojave Narrows Regional Park

III.18.3 Outdoor Recreation by DRECP Ecoregion Subarea

Table III.18-5 shows the acres of lands managed for recreation within the DRECP by ecoregion subarea.

Table III.18-5
Acres of Lands Managed for Recreation by Ecoregion Subarea

Ecoregion Subarea	Lands Managed for Recreation (acres)
Cadiz Valley and Chocolate Mountains	1,537,000
Imperial Borrego Valley	680,000
Kingston and Funeral Mountains	1,005,000
Mojave and Silurian Valley	595,000
Owens River Valley	188,000
Panamint Death Valley	446,000
Pinto Lucerne Valley and Eastern Slopes	563,000
Piute Valley and Sacramento Mountains	343,000

Table III.18-5
Acres of Lands Managed for Recreation by Ecoregion Subarea

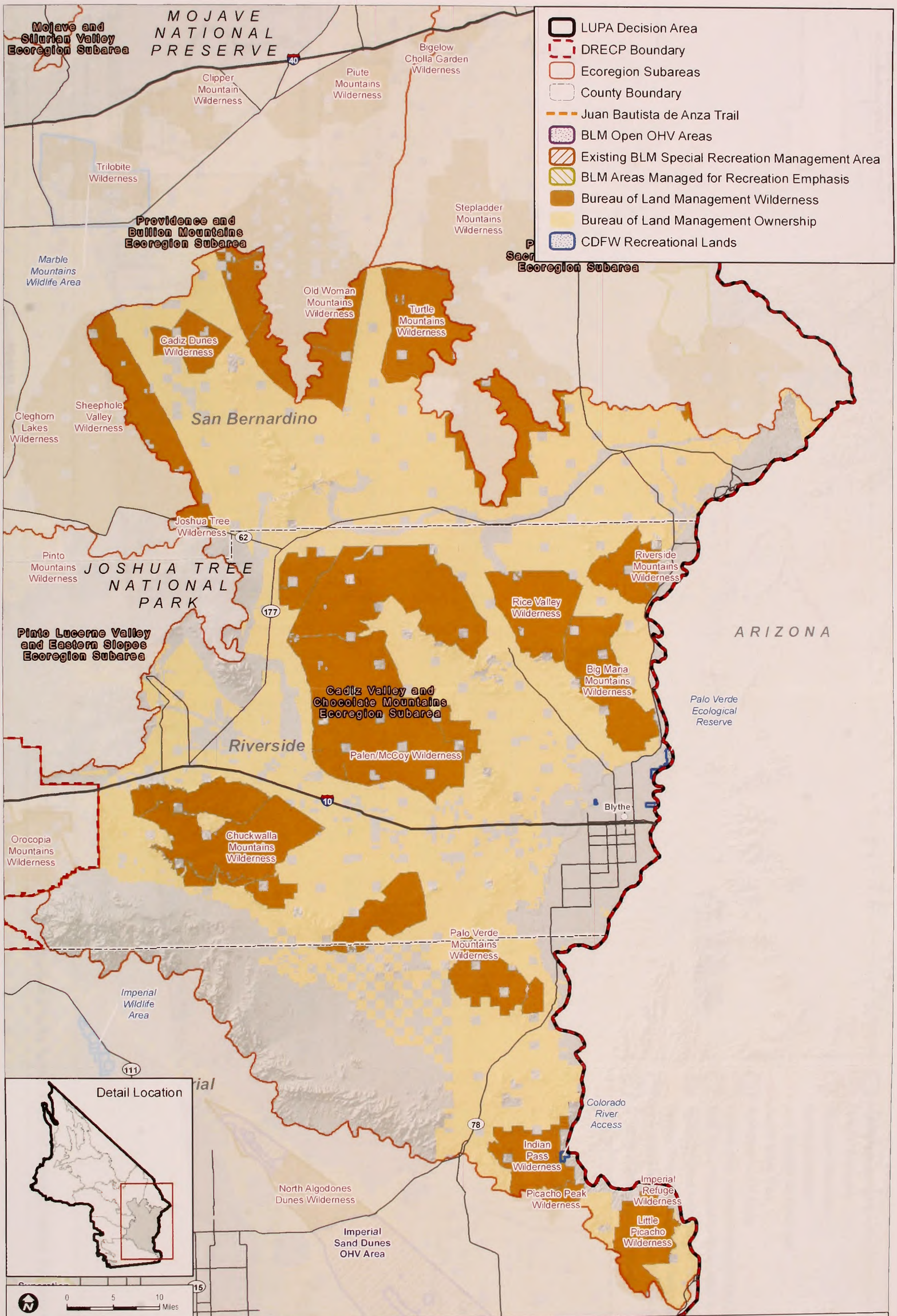
Ecoregion Subarea	Lands Managed for Recreation (acres)
Providence and Bullion Mountains	1,048,000
West Mojave and Eastern Slopes	317,000
Total	**6,722,000**
CDCA Area outside the DRECP boundary	
BLM	921,000
Total	**921,000**

Notes: All acreages derived from best available data. Some of the areas may overlap due to mapping.
The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.
Includes BLM-managed wilderness, SRMAs, ERMAs, and OHV areas

Figures III.18-1 through III.18-10 show the BLM, NPS, and state recreation lands within the DRECP area by ecoregion subarea. Figures III.18-11a and III.18-11b show the recreation lands in the CDCA area outside the DRECP boundary. The types of recreation activities available on these lands are discussed earlier in this chapter in Section III.18.2.

There are 564 miles designated as national trails, and 23 miles as Wild and Scenic Rivers, in the DRECP area. These areas are further described in Chapters III.14 and III.20.

The baseline includes more than 50 renewable energy projects under construction or nearly completed within the DRECP area (see Figure III.1-2a and Figure III.1-2b and Appendix O, Table 2). These existing projects and those currently under construction have impacted recreation and lands available for recreation, so available land is considered in the current affected environment.

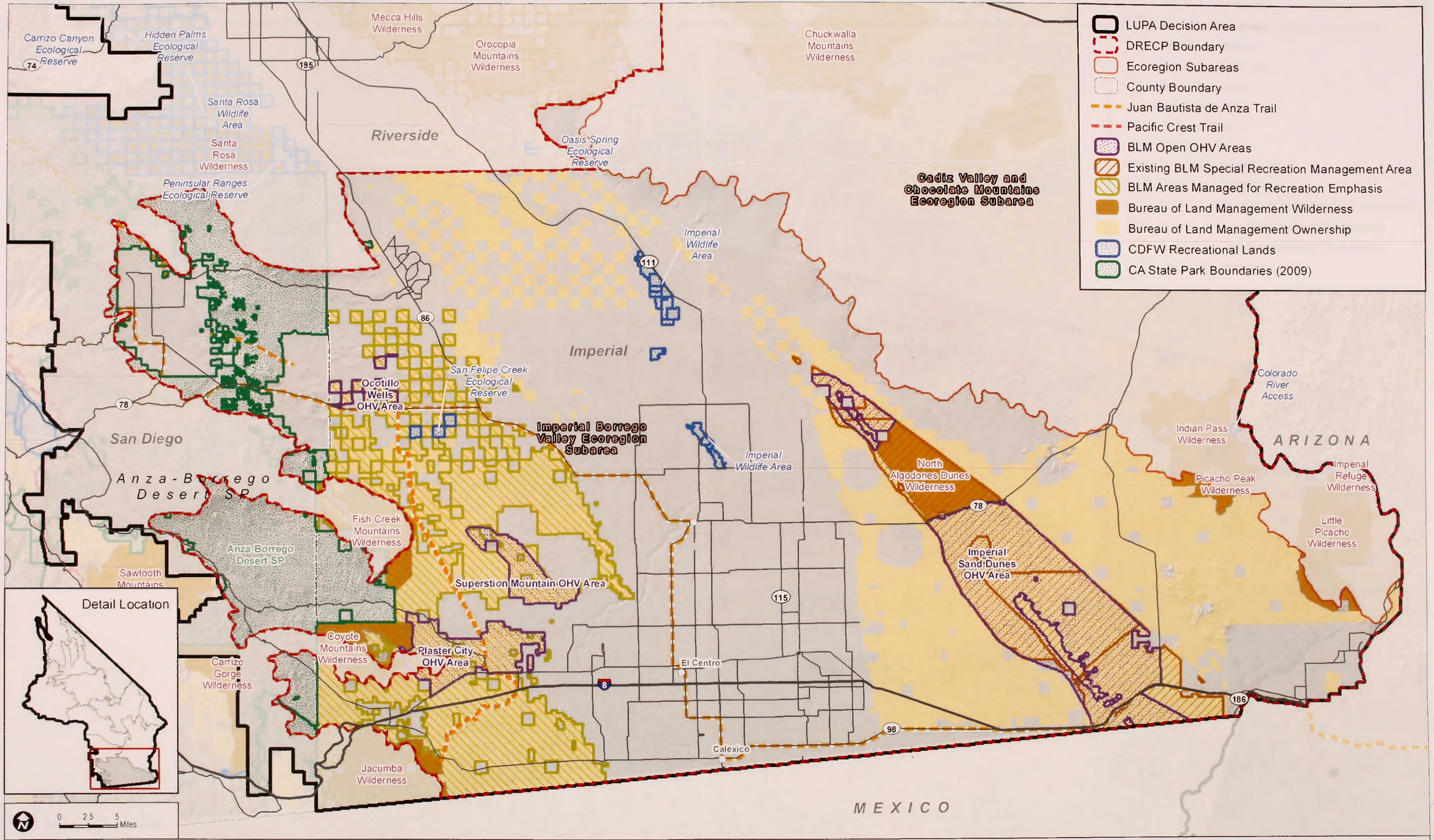


Sources: ESRI (2014); BLM (2015); NPS (2014); USFWS (2013); CA State Parks (2009); CDFW (2014)

FIGURE III.18-1

Recreation Lands in the Cadiz Valley and Chocolate Mountains Ecoregion Subarea

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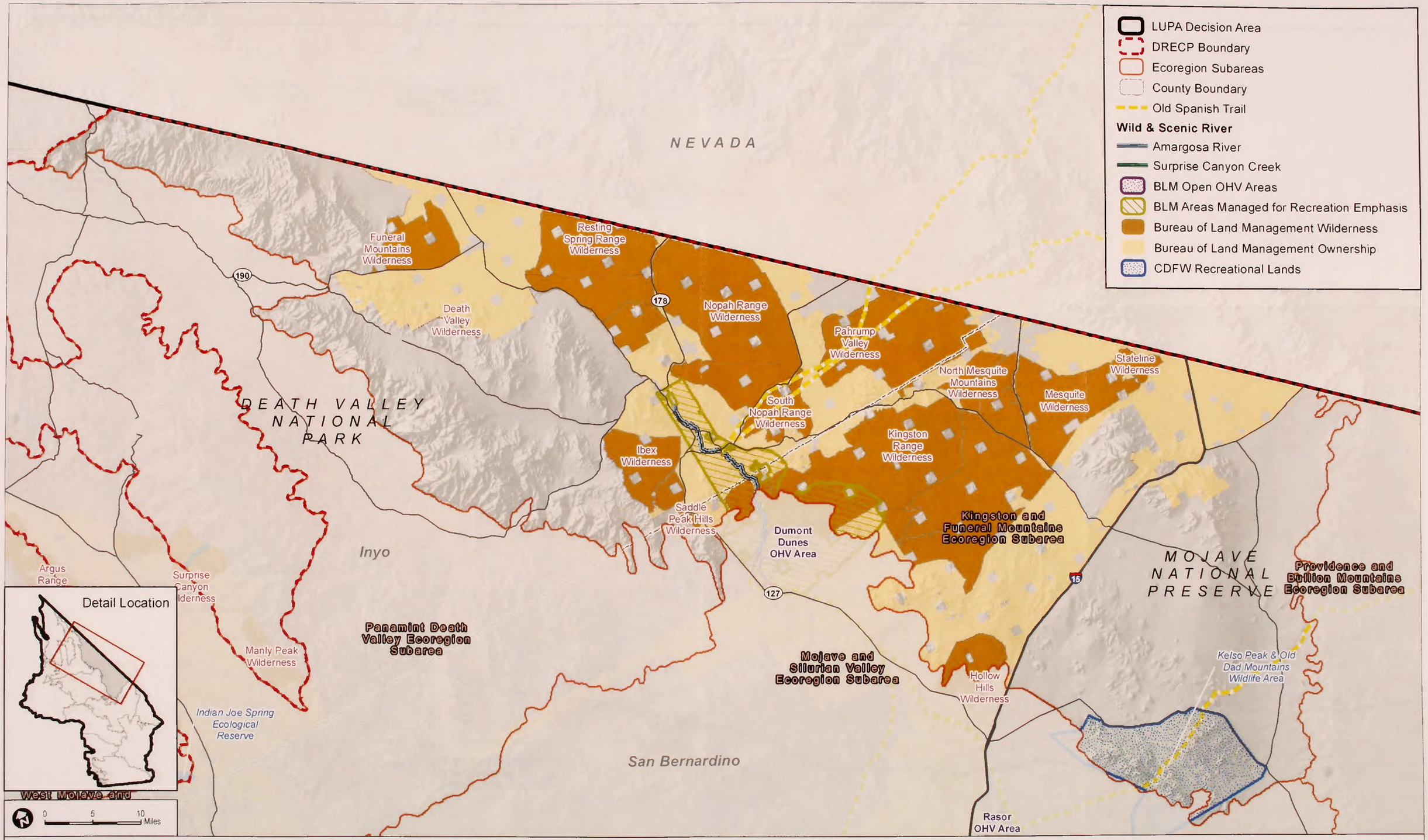
Sources: ESRI (2014); BLM (2015); NPS (2014); USFWS (2013); CA State Parks (2009); CDFW (2014)

FIGURE III.18-2

Recreation Lands in the Imperial Borrego Valley Ecoregion Subarea

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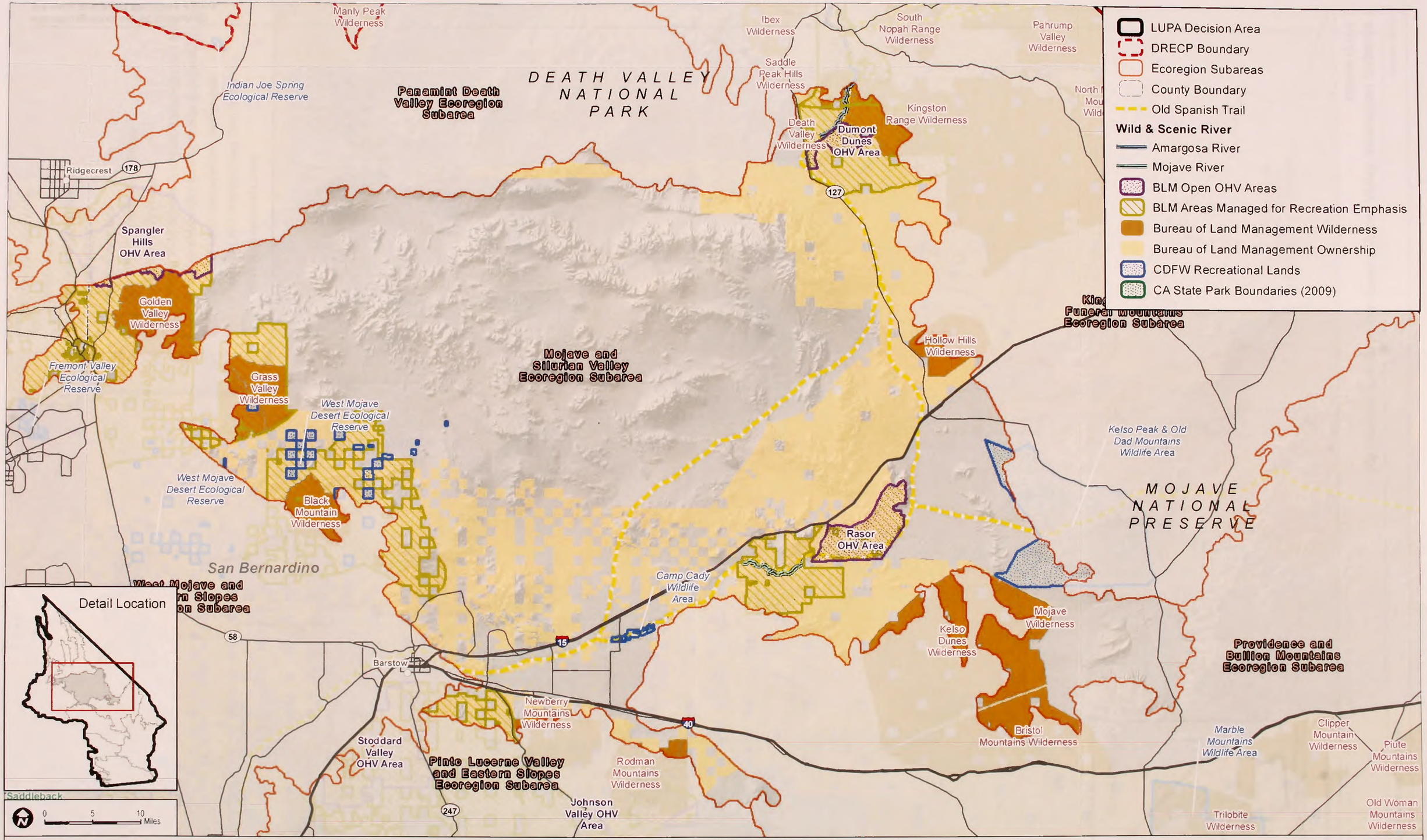


Sources: ESRI (2014); BLM (2015); NPS (2014); USFWS (2013); CA State Parks (2009); CDFW (2014)

FIGURE III.18-3

Recreation Lands in the Kingston and Funeral Mountains Ecoregion Subarea

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Sources: ESRI (2014); BLM (2015); NPS (2014); USFWS (2013); CA State Parks (2009); CDFW (2014)

FIGURE III.18-4

Recreation Lands in the Mojave and Silurian Valley Ecoregion Subarea

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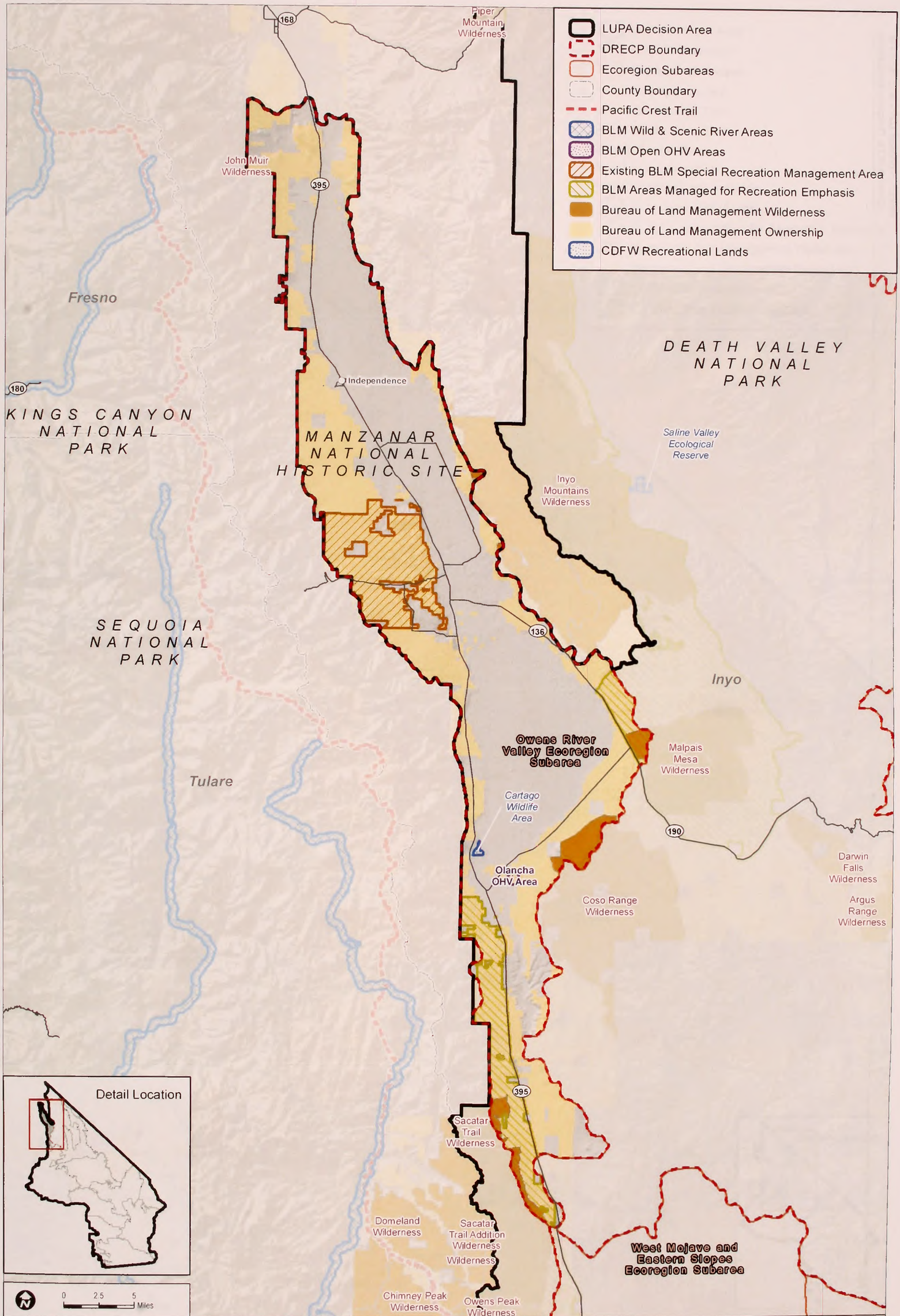
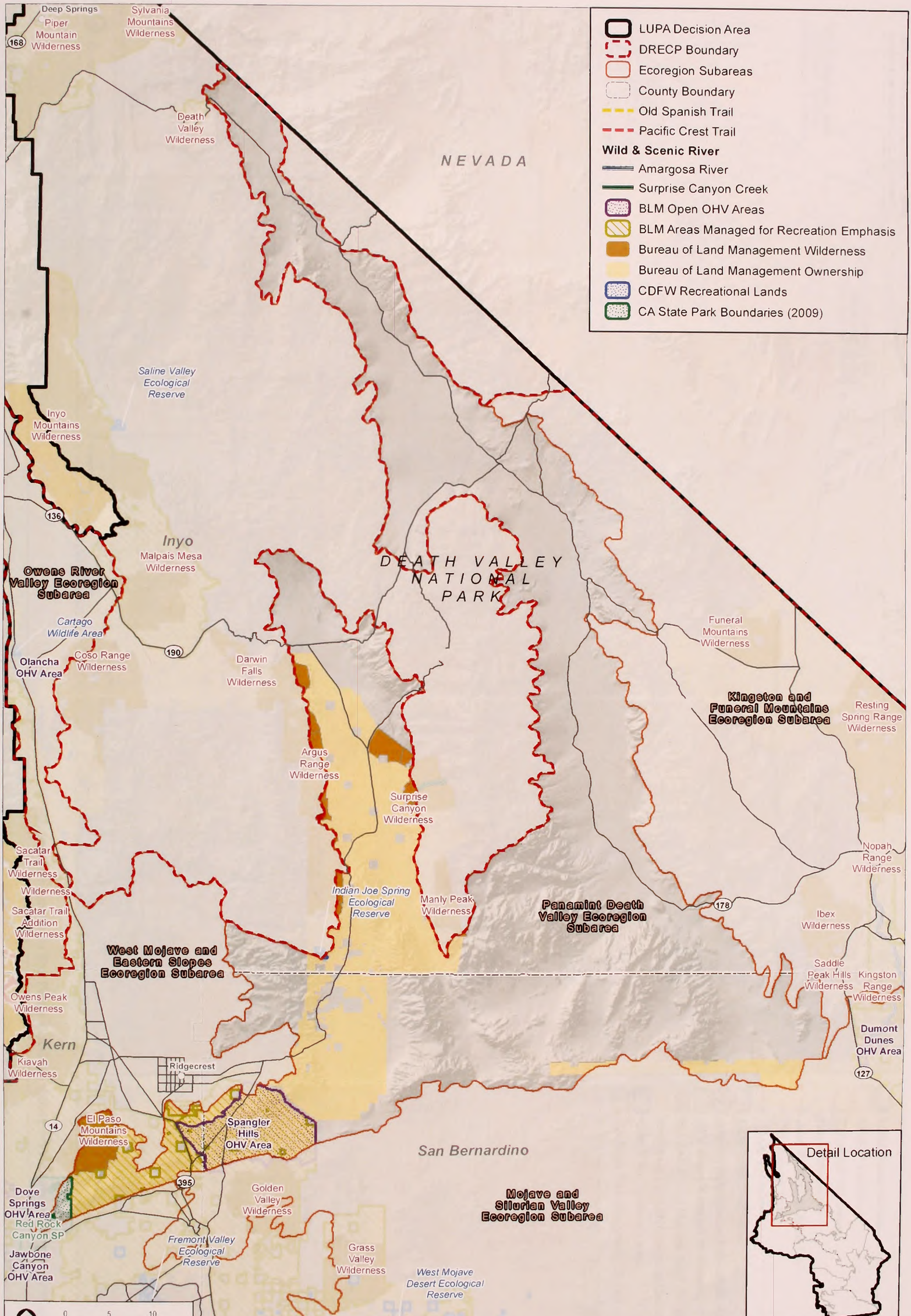


FIGURE III.18-5

Recreation Lands in the Owens River Valley Ecoregion Subarea

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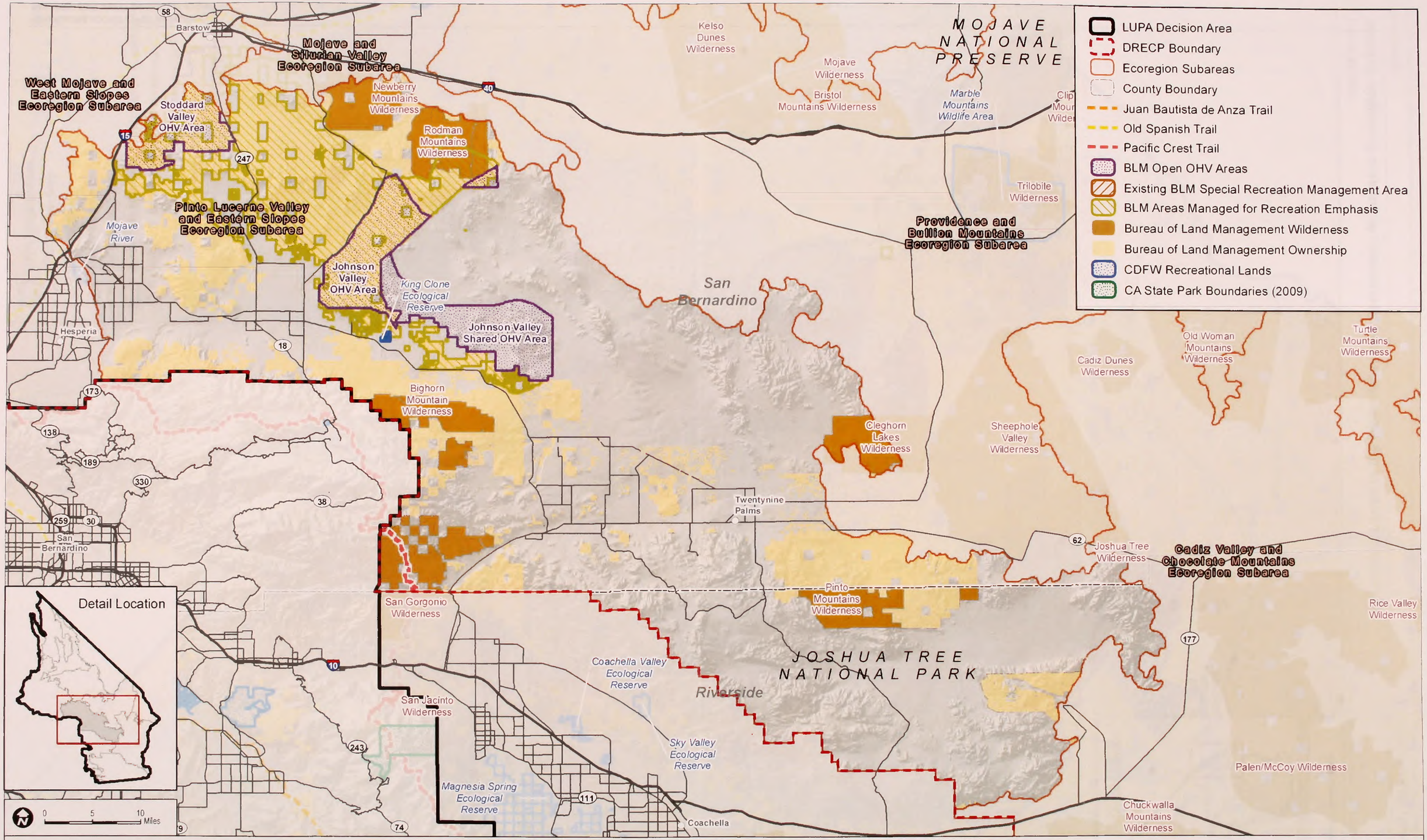
Sources: ESRI (2014); BLM (2015); NPS (2014); USFWS (2013); CA State Parks (2009); CDFW (2014)

FIGURE III.18-6

Recreation Lands in the Panamint Death Valley Ecoregion Subarea

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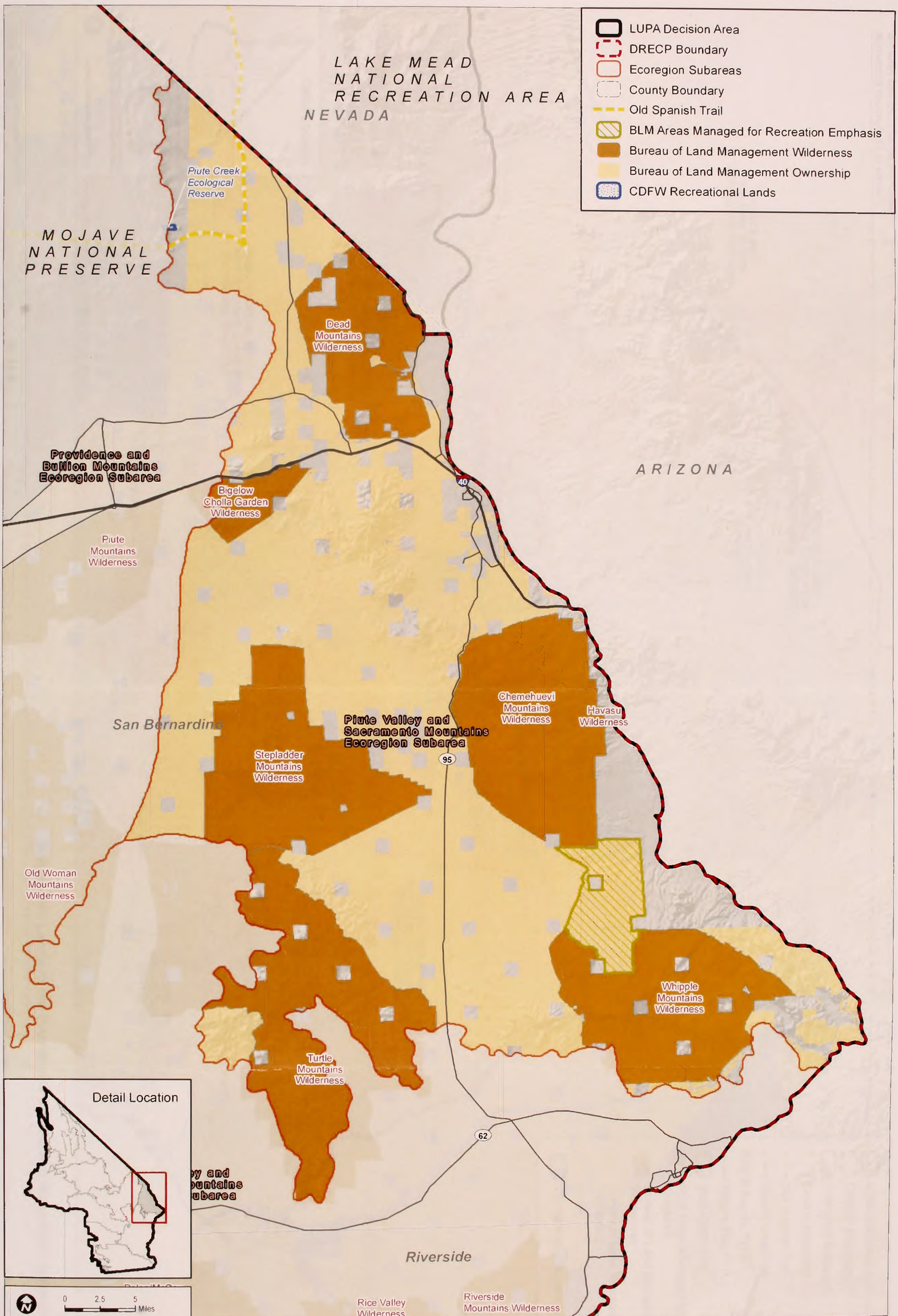


Sources: ESRI (2014); BLM (2015); NPS (2014); USFWS (2013); CA State Parks (2009); CDFW (2014)

FIGURE III.18-7

Recreation Lands in the Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

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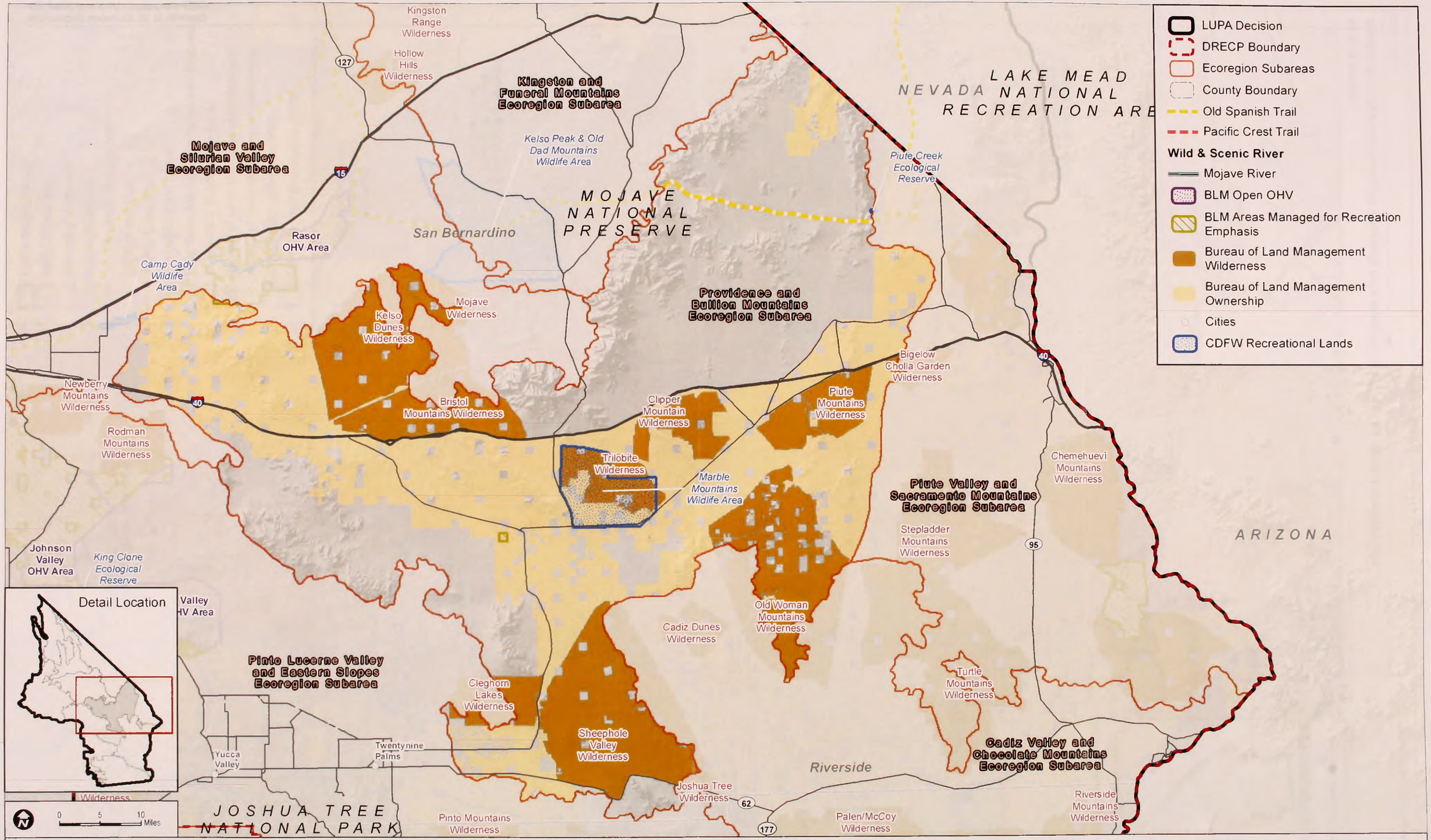
Sources: ESRI (2014); BLM (2015); NPS (2014); USFWS (2013); CA State Parks (2009); CDFW (2014)

FIGURE III.18-8

Recreation Lands in the Piute Valley and Sacramento Mountains Ecoregion Subarea

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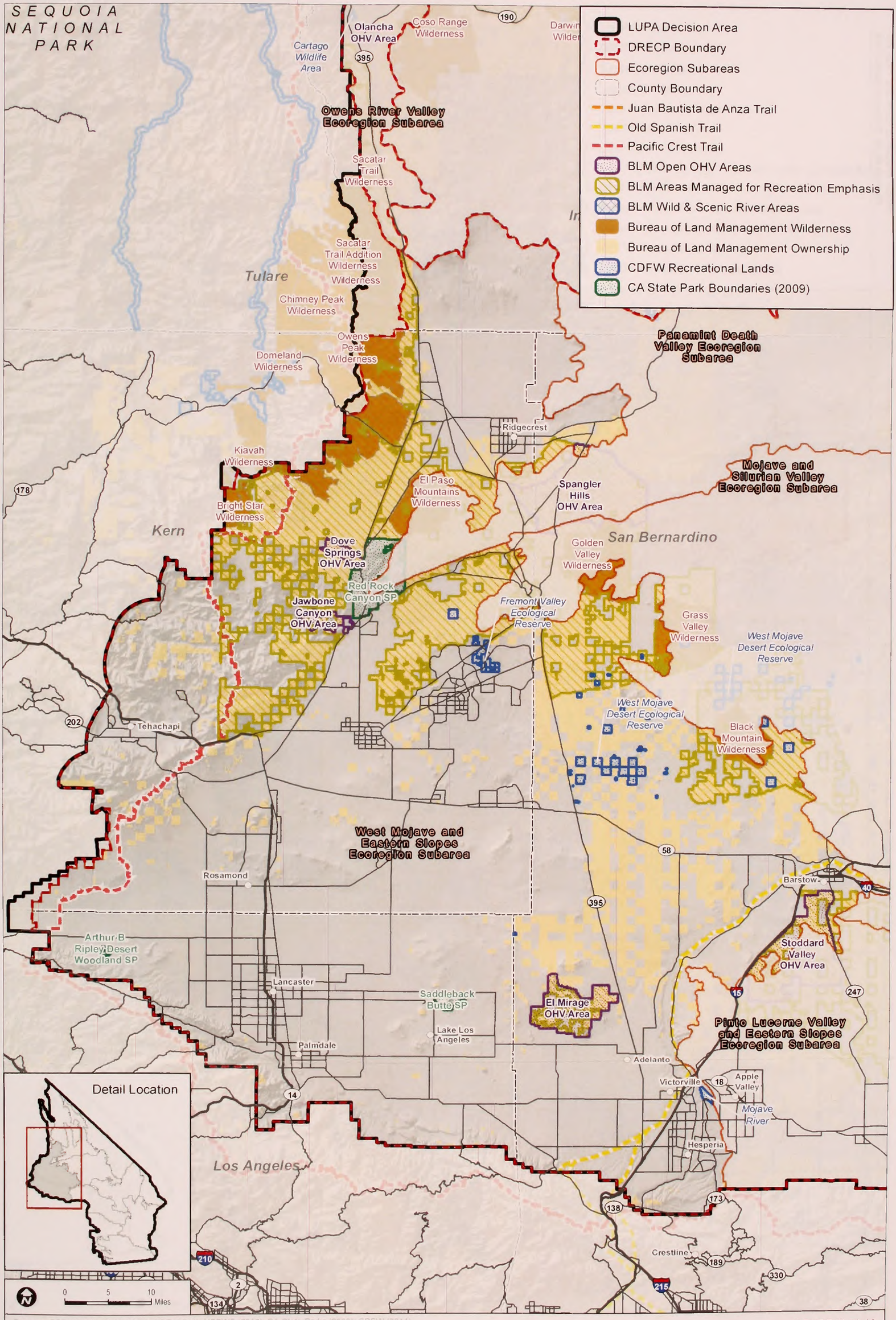


Sources: ESRI (2014); BLM (2015); NPS (2014); USFWS (2013); CA State Parks (2009); CDFW (2014)

FIGURE III.18-9

Recreation Lands in the Providence and Bullion Mountains Ecoregion Subarea

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Sources: ESRI (2014); BLM (2015); NPS (2014); USFWS (2013); CA State Parks (2009); CDFW (2014)

FIGURE III.18-10

Recreation Lands in the West Mojave and Eastern Slopes Ecoregion Subarea

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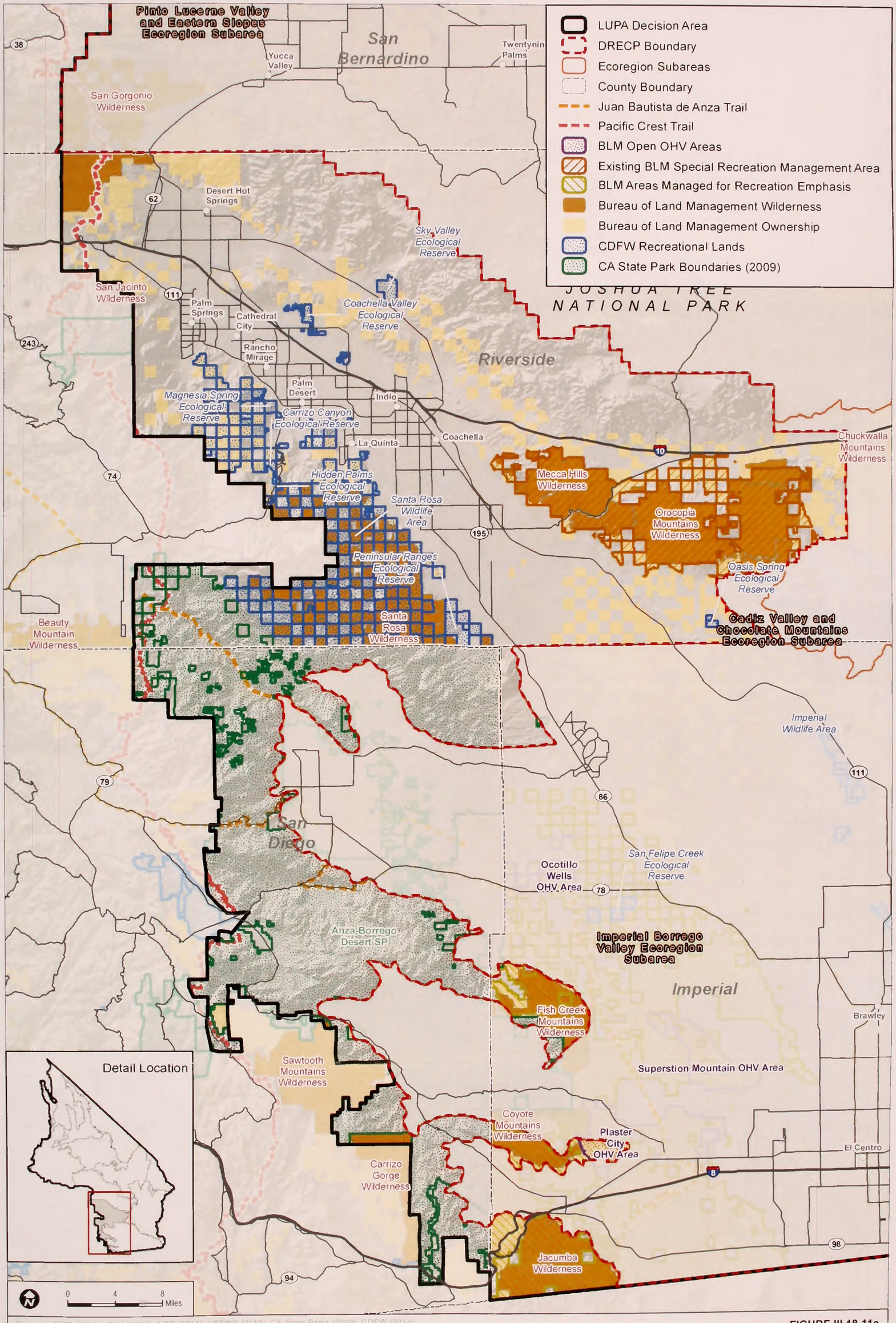
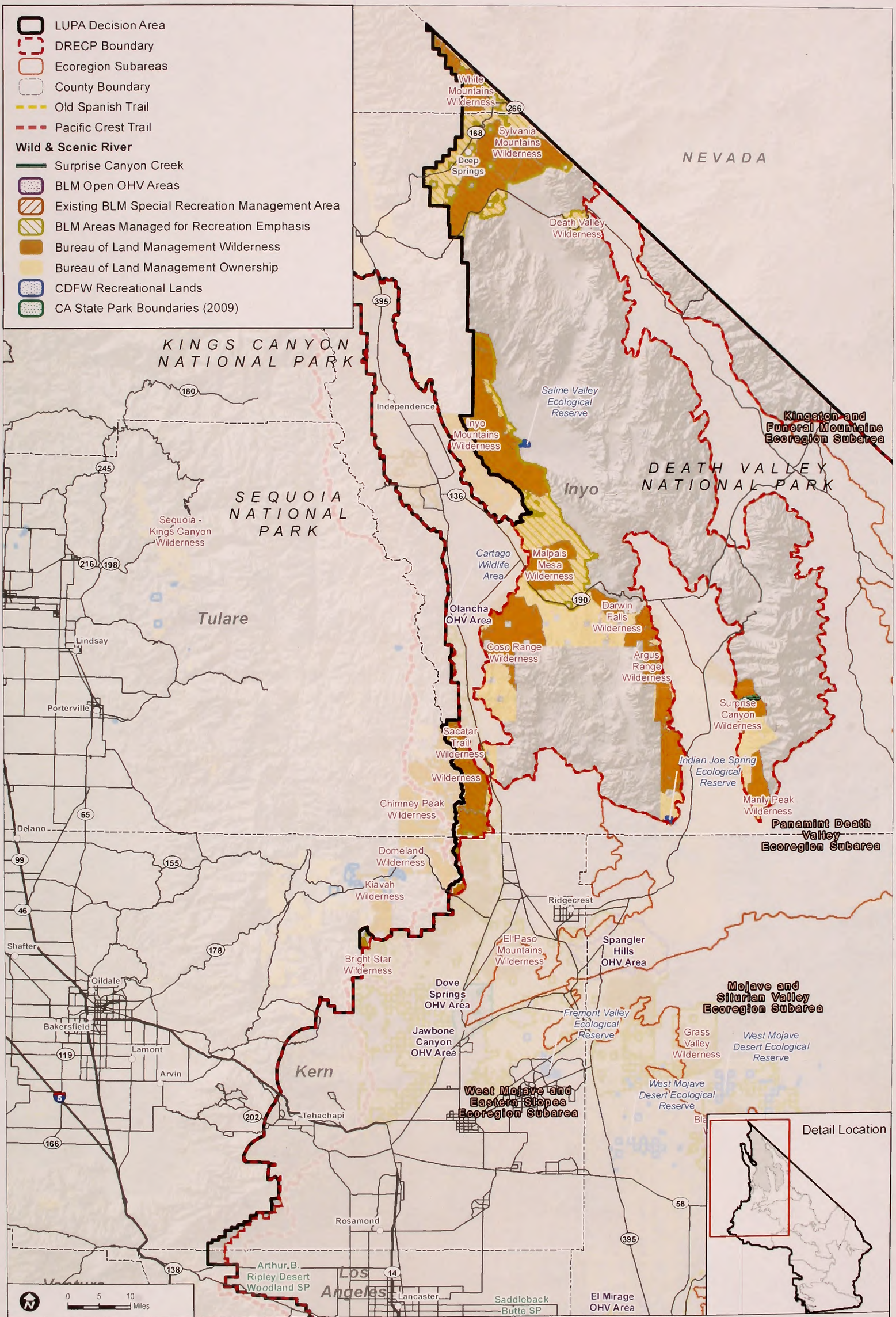


FIGURE III.18-11a

Recreation Lands within the CDCA Area Outside the DRECP Boundary - South

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Sources: ESRI (2014); BLM (2015); NPS (2014); USFWS (2013); CA State Parks (2009); CDFW (2014)

FIGURE III.18-11b

Recreation Lands within the CDCA Area Outside the DRECP Boundary - North

DRECP Proposed LUPA and Final EIS

October 2015

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III.18.4 Outdoor Recreation Outside of DRECP Area

This EIS considers the potential development of transmission lines extending from the DRECP area to the urban areas to the west. Corridors include San Diego County, Los Angeles County, North Palm Springs and Riverside County, and the Central Valley.

Outdoor recreation includes a host of active and passive pursuits. Examples in or near electricity transmission corridors include camping, hiking, off-road vehicle use, and community facilities such as playgrounds, sports fields, outdoor courts, and jogging paths in urbanized areas.

A number of regulations and plans guide the types and location of recreational activities on BLM- and U.S. Forest Service–administered lands outside the DRECP area (see Section III.18.1, Regulatory Setting). These lands are found in the deserts and the mountains north and east of the greater Los Angeles and San Diego urban areas. The development of transmission lines on federal land is under the jurisdiction of those agencies, which take into account their potential effects on recreation.

State, local, and private organizations provide recreational opportunities on nonfederal lands. Examples include state and regional parks, open space preserves, golf courses, and community playgrounds and ball fields. Private landowners may serve some recreational needs as well, for example at equestrian centers and private golf clubs. Transmission lines on nonfederal lands fall under the jurisdiction of the California Public Utilities Commission, which considers the effects of facility siting on land uses, including recreation. Where feasible, the California Public Utilities Commission endeavors to be consistent with the plans and policies of the jurisdictions through which the lines would cross.

Transmission lines entering the Los Angeles and San Diego regions from the north and the east would traverse both undeveloped and extensively developed lands. The lines would cross undeveloped desert and mountain landscapes to reach substations. Many of these desert and mountain areas are available for both active and passive outdoor recreation. In urban areas, transmission line rights-of-way are sometimes used for recreation activities when compatible with safety requirements of those lines.

A transmission line to the Bay Area from the DRECP area would pass through the Tehachapi Mountains and the orchards and cropland or foothill grassland of the western Central Valley.

Table III.18-7 identifies the recreation areas encountered along various transmission corridors leading from the DRECP area to substations outside the DRECP area. Unless specifically restricted, most BLM- and U.S. Forest Service–administered lands are open for passive recreational use. Some active uses, such as OHV travel, are restricted to particular areas and routes. In urban areas, the use of rights-of-way for nontransmission purposes requires agreement with the electric utility that owns the lines.

Table III.18-6
Outdoor Recreation Areas in Transmission Corridors Outside the DRECP Area

Recreation Area	Location
San Diego Area	
Pacific Crest National Scenic Trail	Crossed 2 miles east of Morena Road and Hauser Creek Road
El Capitan Preserve	North of El Monte Road, San Diego County
Goodan Ranch/Sycamore Canyon Preserve	West of SR-67, San Diego County
Los Angeles Area	
Pacific Crest National Scenic Trail	Angeles National Forest
Silver Moccasin National Recreation Trail	Angeles National Forest
Angeles Crest National Recreation Trail	Angeles National Forest
OHV trails	Angeles National Forest
Zapopan Park	Rosemead
Ashiya Park	West Beverly Boulevard, Montebello
Saybrook Park	Saybrook Avenue, East Los Angeles
Hacienda Park	Hacienda Drive, Duarte
Rancho Duarte Golf Course	Las Lomas Road, Duarte
San Gabriel River Trail	Thienes Avenue, South El Monte
Whittier Narrows Recreation Area and Rio Hondo Bike Path	Santa Anita Avenue, South El Monte
North Etiwanda Preserve	Rancho Cucamonga
Sierra La Verne Golf Course	La Verne
San Dimas Canyon Golf Course	San Dimas
Equestrian facility	Conestoga Road, San Dimas
South Hills Park	Glendora
California Country Club	City of Industry
Dawson Park	Glendora
Pico Rivera Municipal Golf Club	Pico Rivera
Streamland Park	Pico Rivera
Rio Hondo Golf Club	Downey
Open space along Southern Avenue	City of South Gate
Soledad Sands Park	Arrastre Canyon Road, Acton
North Palm Springs–Riverside Area	
Oak Valley Golf Club	Beaumont
Catawba Park	Poplar Avenue, Fontana
Sports fields	Shadow Hills and Chaparral Elementary schools, Southridge Village
Pacific Crest National Scenic Trail	Near SR-138

Table III.18-6
Outdoor Recreation Areas in Transmission Corridors Outside the DRECP Area

Recreation Area	Location
American Heroes Park	Hellman Avenue, Eastvale
North and West Meridian Parks	West Preserve Loop, Chino
El Prado Golf Courses	Pine Avenue, Chino
Chino Hills State Park	Near SR-71, Chino Hills
Eastside Community Park	Yorba Linda
Jean Woodard Park	Yorba Linda
Santa Ana River Trail and Yorba Regional Park	East La Palma Avenue, Anaheim Hills
Deer Canyon Park	East Santa Ana Canyon Road, Anaheim Hills
Anaheim Hills Golf Course	Anaheim Hills
Central Valley Area	
None identified	—

III.18.4.1 San Diego Area

New transmission lines from the DRECP area to the San Diego area would be near the existing Sunrise Powerlink 500/230 kV transmission corridor that roughly parallels and runs alternately north and south of Interstate 8 (I-8). From Ocotillo west almost into San Diego County, most of the corridor is in the BLM-administered Yuha Desert Recreation Area. In San Diego County, the route traverses a patchwork of public and private land before crossing north of I-8 near the community of Boulevard. Much of the northerly and westerly route through McCain Valley is BLM-administered land. Leaving McCain Valley, the route enters the Cleveland National Forest and heads south, crossing I-8 near La Posta Road. The corridor continues south through a checkerboard of BLM-administered land, Cleveland National Forest, and private properties and crosses the Pacific Crest National Scenic Trail at Hauser Mountain. Continuing west, the corridor heads north through another checkerboard area of BLM-administered and privately owned lands. West of El Capitan Reservoir on the San Diego River, the corridor passes through a portion of the El Capitan County Open Space Preserve. West of State Route 67, the route skirts San Diego County's Sycamore Canyon and Goodan Ranch Preserve before continuing west to Sycamore Substation outside Marine Corps Air Station Miramar.

III.18.4.2 Los Angeles Area

Renewable electricity from the DRECP area would be transmitted to the Los Angeles area through the Vincent Substation, which is south of Palmdale in northern Los Angeles County. Under the Preferred Alternative, transmission lines would follow two paths from the

substation. One path would be near the existing Tehachapi Renewable Transmission Project Segment 11 corridor to the Mesa Substation in Monterey Park and the Lighthipe Substation near Paramount. Another route would be near the existing Tehachapi Renewable Transmission Project segments 6 and 7 corridor, east of the Segment 11 corridor, which would deliver power to Mesa Substation.

The two Tehachapi Renewable Transmission Project corridors traverse the rugged mountain terrain of the Angeles National Forest west of the San Gabriel Wilderness Area. The corridors extend south through the Angeles National Forest between Vincent Substation near SR-14 and I-210 in San Gabriel Valley. Both traverse designated trails and forest roads.

Upon leaving the Angeles National Forest, the corridors immediately enter the dense suburban landscape of the I-210 and I-10 corridors. Most of the Tehachapi Renewable Transmission Project Segment 11 corridor right-of-way is in agricultural and nursery production areas; however, Zapopan Park is in a section of the alignment between Delta Place and Garvey Avenue in Rosemead. In East Los Angeles, two small parks, Ashiya Park off West Beverly Boulevard and Saybrook Park off Saybrook Avenue, are near the transmission route.

After leaving the Angeles National Forest, much of the Tehachapi Renewable Transmission Project segments 6 and 7 corridor is used for agricultural and nursery production. Hacienda Park is a small neighborhood park off Hacienda Drive. Before crossing I-210, the alignment crosses the Rancho Duarte Golf Course. The route crosses over the San Gabriel River Trail north of the I-605/SR-60 interchange. The route then passes through Whittier Narrows Recreation Area and the Rio Hondo Bike Path south of SR-60 in South El Monte and continues to the Mesa Substation.

In addition to transmission lines out of Vincent Substation, upgrading could occur to an existing 320 kV direct current line between Substation 7 south of Hesperia and Substation B/Substation 8 in south Los Angeles near the City of South Gate. The land uses along this line are similar to those described for the Tehachapi Renewable Transmission Project Segment 11 and segments 6 and 7 corridors. The route traverses open space in San Bernardino National Forest and skirts the southern edge of the North Etiwanda Preserve just north of Rancho Cucamonga. A trail within the route connects Esperanza Drive and Canyon Crest Drive north of I-210 in La Verne. The transmission route includes the southern portions of both the Sierra La Verne and San Dimas Canyon golf courses. An equestrian facility is off Conestoga Road in San Dimas. South of I-210, the route passes to the north of Glendora Sports Park. Crossing over I-210, the route enters the southern part of South Hills Park. Crossing back south over the freeway, a parking lot at Dawson Park is near the route. West of I-605, the transmission line crosses part of the California Country Club in the City of Industry. In Pico Rivera, the route crosses Pico Rivera Municipal Golf

Club in Pico Rivera and athletic fields at Streamland Park. The next recreational facility encountered along the route is the Rio Hondo Golf Club in Downey. Along Southern Avenue through the City of South Gate, much of the route is open space with a path running through it and a few pocket parks.

Another potential corridor would be a new 500 kV transmission line from Vincent Substation to an upgraded Los Angeles Department of Water and Power Station E Substation in North Hollywood. As with the two transmission corridors coming from Vincent Substation, this route would traverse the mountainous National Forest System lands of the Angeles National Forest, including the Pacific Crest National Scenic Trail, before emerging in urbanized greater Los Angeles north of I-210 near Big Tujunga Creek and Tujunga Wash in Lake View Terrace. In the urban area, the route does not cross any recreation areas.

III.18.4.3 North Palm Springs–Riverside Area

Power from the DRECP area would reach load centers through transmission lines passing generally along the I-10 corridor in Riverside County. The primary corridor would be from Colorado River Substation within the DRECP area to Devers, Rancho Vista, and Lugo substations. A second corridor would be between a new Imperial Irrigation District Midway X Substation in the DRECP area and the Devers Substation. A third corridor would be between the Devers and Valley substations.

The corridor from Colorado River Substation to Lugo Substation crosses both undeveloped and developed land. The portion of the corridor along I-10 between Colorado River Substation and Devers Substation near Palm Springs is in the desert. Much of this area is a checkerboard mix of private and BLM-administered land. Joshua Tree National Park is north of I-10, outside the transmission route. The route into and out of Devers Substation is north of I-10 and does not cross any recreation areas. Private desert tours use unpaved roads in the area. In Beaumont, part of the Oak Valley Golf Club is in the route. South of I-10, the corridor enters the Badlands, a mountainous area between Redlands and Moreno Valley. Here much of the route is across open space. In Fontana, Catawba Park off Poplar Avenue is within the route, as are sports fields at Shadow Hills and Chaparral Elementary schools in Southridge Village. Small pocket parks, Garcia Park and Rosena Park West, are adjacent to it in Fontana and Fontana Park on Summit Avenue. The route crosses the Pacific Crest National Scenic Trail near SR-138 before continuing to Lugo Substation near Hesperia.

The corridor from a new Imperial Irrigation District Midway X Substation in Imperial County to Devers Substation would also traverse sparsely populated desert over a mix of BLM and private lands. There are no specific recreation areas along this corridor.

South of Beaumont, the corridor between Devers Substation and Valley Substation passes over the unpopulated lower elevations of the San Jacinto Mountains. There are no recreation facilities within the route.

An additional corridor would extend from Rancho Vista Substation in Rancho Cucamonga to Serrano Substation near Anaheim Hills. In Eastvale, American Heroes Park is on Hellman Avenue near Kimball Avenue. Continuing east, Meridian Park is near the route at Bickmore Avenue and West Preserve Loop in Chino. The route passes Prado Regional Park on Euclid Avenue and crosses the El Prado Golf Courses before reaching Chino Hills State Park near SR-71. Numerous trails cross the rolling terrain of this state park. The corridor emerges from the hills in Yorba Linda and passes through Eastside Community Park and Jean Woodard Park, then the Santa Ana River Trail and Yorba Regional Park on the north side of the river. The route continues south across SR-91 (Riverside Freeway) and through the canyon to Deer Canyon Park. The corridor continues across Anaheim Hills Golf Course to the Serrano Substation off Cannon Street just south of Anaheim Hills.

III.18.4.4 Central Valley

The transmission corridor from Whirlwind Substation in the DRECP area crosses over the Tehachapi Mountains to the San Joaquin Valley south of Arvin and then continues north along the I-5 corridor connecting the Midway, Gates, and Los Banos substations before ending at the Tesla Substation near Tracy. The landscape is largely agricultural land, in use for irrigated crops, orchards, feedlots, or grassland. No recreation areas were identified in this corridor.

III.18.4.5 Substations

Transmission lines carrying power from the DRECP area would tie into existing substations, which would be upgraded or enlarged to handle the additional load. There are no recreation facilities in the immediate areas surrounding these substations.

III.19 TRANSPORTATION AND PUBLIC ACCESS

This chapter describes the regulatory framework of transportation within the Land Use Plan Amendment (LUPA) Decision Area and the transportation and public access infrastructure.

Travel and transportation are integral parts of virtually every activity on public lands including recreation, livestock grazing, wildlife management, commodity resources management, rights-of-way (ROWs) for private inholdings, and public land management and monitoring. Comprehensive travel and transportation management encompasses the planning, management, and administration of motorized and nonmotorized roads, primitive roads, and trails to ensure that public access, natural resources, recreational opportunities, and regulatory needs are considered. Two of the Bureau of Land Management's (BLM's) greatest management challenges are providing reasonable and varied routes for access to public lands while also providing areas for a variety of motorized and nonmotorized recreation, various landscapes, user interests, equipment options, weather conditions, transportation infrastructure, and resource constraints.

Nonmotorized recreation, including pedestrians and cyclists, and recreational off-highway vehicle (OHV) use are discussed in Chapter III.18, Outdoor Recreation. Other chapters relating to transportation and public access include Chapter III.14, BLM Land Designations; Chapter III.24, Department of Defense (DOD) Lands and Operations; and Chapter III.22, Public Health, Safety, and Services.

Appendix R1.19 includes maps that show the federal routes, state routes, and railways that traverse the LUPA Decision Area.

III.19.1 Regulatory Setting

III.19.1.1 Federal

Executive Orders 11644 and 11989 contain guidelines for the controlled use of OHVs on public lands. These executive orders require that all BLM lands be designated as open, closed, or limited for OHV use (43 Code of Federal Regulations [CFR] 8340).

III.19.1.1.1 Bureau of Land Management Routes of Travel

Routes of travel are designated in areas that are limited for OHV use. The BLM routes of travel network (motorized and nonmotorized routes crossing BLM-administered public lands) and motor vehicle access area designations within the California Desert Conservation Area (CDCA) have been developed, since 1980, as part of the CDCA Plan, the Motor Vehicle Access Element, and subsequent plan amendments. Goals and objectives for the Motor Vehicle Access Element include the following:

- Provide for constrained motorized vehicle access in a manner that balances the needs of all desert users, private landowners, and other public agencies.

- Avoid adverse impacts to desert resources, to the degree possible, when designating or amending areas or routes for motorized vehicle access. Use maps, signs, and published information to communicate the motorized vehicle access situation to desert users. Ensure that all information materials are understandable and easy to follow.

The BLM routes of travel network improves opportunities for recreational use in the CDCA while protecting sensitive resource values and resolving conflicts among users. Changes to these designations have occurred over time and through plan amendments, primarily to minimize impacts to sensitive plant, animal, and cultural resources. Examples of minimization actions include designations of Areas of Critical Environmental Concern (ACEC) and wildlife management areas with additional travel restrictions, route reductions, and effectiveness monitoring. The BLM routes of travel currently include 11,640 miles of routes, available for motorized use, in the DRECP area. A few routes have also been designated for exclusively nonmechanized or nonmotorized use in the DRECP area.

Various area or route-specific limitations on types of use, seasons of use, and other measures that minimize impacts to resources are included on available motorized routes. These limitations may include fencing or camping limitations and allowances adjacent to open routes, limits to type of vehicles for some routes, closures during lambing or nesting seasons, setbacks from riparian areas, limitations to authorized users, and other similar provisions.

CDCA Plan amendments that address OHV use and minimize impacts to resources include the following:

1. Northern and Eastern Colorado (NECO) Desert CDCA Plan Amendment (NECO 2002).
2. Western Colorado (WECO) OHV Routes of Travel Designation Plan (WECO 2003).
3. Northern and Eastern Mojave (NEMO) Desert CDCA Plan Amendment (NEMO 2002).
4. West Mojave Desert (WEMO) CDCA Plan Amendment (WEMO 2006).

The BLM Bakersfield and Bishop field offices also have Resource Management Plans (RMPs) that address travel management. Each RMP designates routes consistent with regulations (43 CFR 8342.1).

III.19.1.1.1.1 Northern and Eastern Colorado Desert CDCA Plan Amendment

NECO focuses on conservation management of 3.8 million acres. As part of its management strategy, NECO designates travel routes on BLM lands in Imperial, Riverside, and San Bernardino counties that are compatible with the conservation of species, habitats, and

other needs for general and special purpose public access. NECO adopts the same goals and objectives as those in the Motorized Vehicle Access Element of the CDCA Plan.

III.19.1.1.1.2 Northern and Eastern Mojave Desert CDCA Plan Amendment

NEMO outlines the conservation strategy for management of special-status species and habitats on public lands within Inyo, Mono, and San Bernardino counties. The amendment covers approximately 2.7 million acres. Designation of travel routes is included among the land use planning decisions in NEMO. Areas open for motorized vehicle use in the NEMO planning area include Dumont Dunes Open OHV Area and Silurian Dry Lake Bed. Wilderness in the DRECP area (approximately 1.2 million acres) is closed to motorized vehicle use. The remaining area, 1.4 million acres, is limited for motorized vehicle use.

III.19.1.1.1.3 Western Colorado Desert CDCA Plan Amendment

WECO establishes site-specific route designations based on and tiered to the CDCA Plan. The WECO planning area covers approximately 475,000 acres; the plan designates approximately 2,320 miles of open OHV routes in parts of Imperial County. WECO provides a balance between protecting resources and providing for OHV use by updating previous designations for OHV limited use areas in Imperial County.

III.19.1.1.1.4 West Mojave Desert CDCA Plan Amendment

WEMO applies to 3.3 million acres of BLM-managed lands. WEMO conserves and protects the desert tortoise, the Mohave ground squirrel, and nearly 100 other listed or special-status wildlife species and their habitats. Route designation is one of the key issues WEMO addresses. BLM is revising WEMO to address OHV route designations within the WEMO planning area.

III.19.1.1.1.5 Caliente Resource Management Plan

All public lands within the Caliente Resource Area are either limited or closed to vehicles. There are no open areas. At certain times of the year, routes may be seasonally closed. Designations are based on resource protection, promotion of the safety of all the users, multiple-use management, the need for access, and the minimization of conflicts among various uses of the public lands. The areas closed to all vehicular travel include wilderness, Point Sal, Blue Ridge, and the Pacific Crest National Scenic Trail.

Under the Bakersfield RMP, BLM Bakersfield Field office lands in the DRECP area were designated as OHV limited; vehicles would be allowed on designated roads and trails only.

III.19.1.1.1.6 Bishop Resource Management Plan

Vehicle use in the Bishop Resource Management Plan area is limited to designated roads and trails on 748,700 acres. Poleta Canyon is open to vehicle use on 1,300 acres. All congressionally designated wilderness is closed to vehicle use. At certain times of the year, routes may also be seasonally closed.

III.19.1.1.2 Off-Road Vehicles on Public Lands

The BLM has designated all lands in the CDCA as open, closed, or limited to OHV use.

An *Open area* is an area where all types of vehicle use are permitted at all times, subject to operating regulations and vehicle standards (43 CFR 8340-8342). Under the CDCA Plan, this designation applies to lands specifically designated as open for vehicle travel, in addition to certain sand dunes and dry lakebeds (listed in the CDCA Plan). For additional information on recreational opportunities in open areas, see Chapter III.18, Outdoor Recreation, Section III.18.2.1.3, Off-Highway Vehicle Areas. These areas do not require the BLM routes of travel network. However, major access and through routes may be identified to link the OHV area to the surrounding routes of travel network.

A *Closed area* is an area where OHV use is prohibited. Under the CDCA Plan this designation applies to (1) all congressionally designated wilderness, unless exempted; (2) land in ACECs provided for in the management plan for the ACEC; (3) certain sand dunes and dry lakes (as listed in the CDCA Plan); and (4) other public lands, regardless of location, closed to protect sensitive resources or for public safety.

A *Limited area* is an area restricted at certain times, in certain locations, or to certain vehicular use. Under the CDCA Plan, vehicle access will be restricted to designated routes of travel in accordance with the rules for each multiple-use class or Special Area, as outlined in the CDCA Plan (see Section III.19.1.1.1). This designation applies to all public lands that are not in closed or open areas.

The BLM uses established criteria to designate lands as open, closed, or limited for off-road vehicles, including the designation of travel routes within the LUPA Decision Area. All designations shall be based on the protection of public lands resources, promotion of the safety of all users of public lands, and minimization of conflicts among various uses of those public lands according to the following (43 CFR 8342.1):

- Areas and trails shall be located to minimize damage to soil, watershed, vegetation, air, or other resources of the public lands and to prevent impairment of wilderness suitability.

- Areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats.
- Areas and trails shall be located to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands, and to ensure the compatibility of such uses with existing conditions in populated areas, taking into account noise and other factors.
- Areas and trails shall not be located in officially designated wilderness areas or primitive areas. Areas and trails shall be located in natural areas only if the authorized officer determines that off-road vehicle use in such locations will not adversely affect their natural, esthetic, scenic, or other values for which such areas are established.

III.19.1.1.3 BLM Roads and Trails Terminology

In 2006, the BLM issued Instruction Memorandum No. 2006-173, which established policy for the terminology and definitions associated with the management of transportation-related linear features (see Section III.19.2.5, BLM Routes of Travel, for definitions of Road, Primitive Road, and Trail).

III.19.1.1.4 Federal Highway Administration

The Federal Highway Administration (FHWA) coordinates transportation on the federal highway system in cooperation with states and other partners. Among the programs of the FHWA is the Federal-Aid Highway Program, which provides federal financial assistance to states for the construction and improvement of the highway system, urban and rural roads, and bridges. This program provides for general improvements and development of safe highways and roads. Roadway improvements made within the LUPA Decision Area could receive federal funds, subject to FHWA approval.

III.19.1.1.5 Other Federal Transportation Regulations

Federal transportation regulations (49 CFR Subtitle B) contain standards pertaining to interstate and intrastate transport–including hazardous materials program procedures and provides safety measures for motor carriers and motor vehicles that operate on public highways.

III.19.1.2 State

Renewable development on BLM lands may require use of state and county roads during construction and operations to reach the development sites. As such, the following is for informational purposes.

III.19.1.2.1 California Vehicle Code

The California Vehicle Code contains regulations applicable to roadway damage; licensing, size, weight, and load of vehicles operated on highways; safe operation of vehicles; and transportation of hazardous materials.

III.19.1.2.2 California Streets and Highways Code

The California Streets and Highways Code mandates that permits issued by the California Department of Transportation (Caltrans) be required for any roadway encroachment during truck transportation and delivery, as well as for any load that exceeds the California Department of Transportation's (Caltrans) weight, length, or width requirements for public roadways.

III.19.1.3 County

III.19.1.3.1 Imperial County

The Imperial County General Plan, Circulation and Scenic Highways Element, approved in 2008, accommodates a pattern of concentrated and coordinated growth, with regional and local linkage systems between communities and neighboring metropolitan regions. The Imperial County General Plan (1) ensures safe and coordinated traffic patterns and contiguous growth and promotes planned and consistent development around city and township areas (Objective 1.3); (2) maintains and, where appropriate, extends the existing network of local streets (Objective 1.4); (3) designs collocated or joint use transportation corridors with transmission, water, and other infrastructures to the extent possible (Objective 1.16); and (4) protects areas of outstanding scenic beauty along scenic highways, as well as the aesthetics of those areas (Objective 4.3) (Imperial County 2008).

III.19.1.3.2 Inyo County

The Inyo County 2013 Draft General Plan Update includes policies to protect existing county roads from the impacts from new development by requiring new developments to either subsidize those impacts or contract for their repair or reconstruction; take every opportunity to safeguard existing, and promote additional, access to public lands; and promote establishment of OHV access routes. Furthermore, a previously proposed policy to

complete a paved route between Death Valley north of Scotty's Castle and Big Pine has been rescinded (Inyo County 2013).

III.19.1.3.3 Kern County

The Kern County General Plan, Circulation Element, establishes a Level of Service (LOS) D as acceptable within the General Plan area for county-maintained roads, and LOS D for state highways. (LOS is a qualitative measure of operating conditions within a traffic stream.) The General Plan also stipulates that neither Kern County nor developers may widen or build new roads if ROWs are not set up to allow orderly growth. In addition, continuity and integrity of the arterial and collector system at the mountain or desert region boundary must be reviewed and approved by Kern County in conjunction with individual project adoption (Kern County 2009).

The Circulation Element identifies truck travel, which makes up 26% of all vehicle miles, as higher than the state average. Eastern Kern County has major employers including oil and mineral extractors, agriculture, local government, and the military, which may cause residents to "reverse commute" into unincorporated rural areas for work.

III.19.1.3.4 Los Angeles County

The Los Angeles County General Plan Mobility Element concerns the connection between land use planning and mobility in the county. It primarily focuses on issues related to urban areas and applies specifically to Lancaster, Palmdale, and other developed areas in the DRECP area of the county. The General Plan Mobility Element does not have policies specific to rural, undeveloped areas outside of those cities (Los Angeles County 2012).

III.19.1.3.5 Riverside County

The Circulation Element of the Riverside County General Plan accommodates a pattern of concentrated growth, providing both a regional and local linkage system between unique communities. The Circulation Element contains provisions related to the development of the county's rural and desert regions. Road design and development policies include:

- Improving highways serving as arterials through mountainous and rural areas to adequately meet travel demands and safety requirements while minimizing the need for excessive cut and fill (Policy C 3.12).
- Supporting ongoing efforts to identify funding and improve existing dirt roads (Policy C 3.32).
- Assuring all-weather, paved access to all developing areas (Policy C 3.33).

- Collaborating with all incorporated cities and all adjacent counties to implement and integrate ROW requirements and improvement standards for General Plan roads that cross jurisdictional boundaries (Policy C 7.8).
- Avoiding, where practicable, disturbance of existing communities and biotic resource areas when identifying alignments for new roadways, or for improvements to existing roadways and other transportation system improvements (Policy C 20.8).

In addition, the Circulation Element stipulates preserving scenic routes with exceptional or unique visual features, according to the Caltrans Scenic Highways Plan (Policy C 19.1), and states that wind turbines are now proven tourist attractions (Policy C 19.2) (Riverside County 2013).

III.19.1.3.6 San Bernardino County

San Bernardino County's General Plan (adopted 2007, amended 2013) includes the goal D/CI 1, which ensures a safe and effective transportation system that provides adequate traffic movement while preserving the rural desert character of the region. Policies ensure that all new development proposals do not degrade levels of service on major roadways below LOS C in the Desert Region (Policy D/CI 1.1). Policies also design road standards and maintain major thoroughfares to complement the surrounding environment within the Desert Region (Policy D/CI 1.8) and re-evaluate major and secondary highway designations in remote desert areas with the goal of downgrading designations on roads with low traffic counts (Policy D/CI 1.10) (San Bernardino County 2007).

III.19.1.3.7 San Diego County

San Diego County requires that development projects maintain a level of service of D or higher on all roads identified within the San Diego County General Plan, Mobility Element (Policy M-2.1). In addition, public roads in rural regions should be designed and constructed to be compatible with rural character (Policy M-4.3). The Mobility Element of the San Diego County General Plan, however, does not have other transportation policies specifically relevant to DRECP-related development (San Diego County 2011).

III.19.2 Transportation Facilities Within the LUPA Decision Area

Roadway, rail, and air transportation facilities serve the LUPA Decision Area. Nonmotorized recreation is discussed in Chapter III.18 and airports and aircraft operations are discussed in Chapter III.22.

III.19.2.1 Federal Highways

Interstate 8: I-8 is an east–west highway that begins at the junction with I-10 just south of Casa Grande, Arizona, and ends in San Diego, California. This interstate traverses the southern portion of the LUPA Decision Area.

Interstate 10: I-10 is the southernmost, east–west, coast-to-coast interstate highway in the United States. It begins in Jacksonville, Florida, and ends in Santa Monica, California. This interstate traverses the south-central portion of the LUPA Decision Area.

Interstate 15: I-15 is a north–south transcontinental highway that begins in Sweetgrass, Montana, and ends in San Diego, California. I-15 traverses the central portion of the LUPA Decision Area.

Interstate 40: I-40 is an east–west highway that begins in Wilmington, North Carolina, and ends in Barstow, California. This interstate traverses the central portion of the LUPA Decision Area.

U.S. Route 95: U.S. 95 is a north–south highway in the western United States. The highway begins in Boundary County, Idaho, and ends in San Luis, Arizona. U.S. 95 extends north of Blythe from I-10. It travels largely parallel to the west bank of the Colorado River until it joins I-40 in Needles. The total distance in California is about 130 miles, all of which is within the eastern portion of the LUPA Decision Area.

U.S. Route 395: U.S. 395 is a north–south highway in the western United States. The highway begins near Laurier, Washington, and ends in the Mojave Desert at I-15 near Hesperia, California. In the western portion of the LUPA Decision Area, U.S. 395 runs along the east side of the Sierra Nevada in the Owens Valley.

III.19.2.2 State Routes

State Route 14: SR-14 is a north–south state highway that traverses the Mojave Desert. The route connects with I-5 near Santa Clarita, California, and with U.S. 395 near Inyokern, California. The southern part of the route serves the communities of Santa Clarita, Palmdale, and Lancaster, and connects them with the Los Angeles area. The northern portion of the route is rural. Most of SR-14 roughly parallels a main line of the Union Pacific Railroad (UPRR).

State Route 18: SR-18 runs east–west within the LUPA Decision Area, from SR-210 (as a 4-lane expressway) in San Bernardino to SR-138 (as a 2-lane mountain road) near Adelanto. It is the primary route into the San Bernardino Mountains. Part of the California Freeway

and Expressway System, SR-18 is eligible for the State Scenic Highway System, but Caltrans has not designated it as a scenic highway.

State Route 58: SR-58 is an east–west highway across the California Coast Ranges, the southern San Joaquin Valley, the Tehachapi Mountains, and the Mojave Desert. SR-58 begins at Barstow (junction with I-15) and ends near Santa Margarita (junction with U.S. 101). SR-58 provides access to Edwards Air Force Base. Part of the California Freeway and Expressway System, SR-58 is eligible for the State Scenic Highway System, but Caltrans has not designated it as a scenic highway.

State Route 62: SR-62 runs east–west within the LUPA Decision Area. The route begins at the Arizona border, where it meets Arizona SR-95 in Parker and ends at an intersection with I-10 northwest of Palm Springs, California. East of Twentynine Palms, the route becomes one of the more desolate stretches of highway in the state, devoid of services for its remaining 100 miles in California. Travelers between the eastern Coachella Valley and the Colorado River use this stretch as the fastest route to the resorts of the Colorado River, accessing it via SR-177 in Desert Center.

Part of the California Freeway and Expressway System, SR-62 is eligible for the State Scenic Highway System. Caltrans has recognized the entire length of SR-62 as a scenic highway. More information about this designation is presented in Chapter III.20, Visual Resources.

State Route 78: SR-78 runs from Oceanside east to Blythe, traversing nearly the entire width of the state. It begins at I-5 in San Diego County and ends at I-10 in Riverside County. The route is a freeway through the heavily populated cities of northern San Diego County and a 2-lane highway running through the Santa Rosa Mountains to Julian and its terminus in Blythe.

State Route 86: SR-86 runs from SR-111 near Calexico through the Imperial Valley via El Centro and Brawley and around the west side of the Salton Sea into the Coachella Valley, where it ends in Indio at Avenue 46. SR-86 and SR-111 have been decommissioned in the city of Indio, but the routing continues as Indio Boulevard all the way to I-10. SR-86 is part of the California Freeway and Expressway System.

State Route 98: SR-98 loops from I-8 through the border city of Calexico, California. SR-98 begins at an interchange with I-8 southwest of the community of Ocotillo and terminates at the Midway Well interchange with I-8, just west of the Imperial Sand Dunes Recreation Area.

State Route 111: SR-111 is the main north–south state highway and retail corridor through the Coachella Valley, beginning at I-10 at White Water and ending in Calexico. SR-111 links nearly every desert resort city in the valley. Part of the California Freeway and

Expressway System, SR-111 is eligible for the State Scenic Highway System, but Caltrans has not designated it as a scenic highway.

State Route 115: SR-115 runs from I-8 southeast of Holtville to Calipatria in Imperial County. Part of the California Freeway and Expressway System, SR-115 is eligible for the State Scenic Highway System, but Caltrans has not designated it as a scenic highway.

State Route 127: SR-127 runs from I-15 in Baker to Nevada, where it ends at Nevada SR-373. Parts of SR-127 form the eastern boundary of Death Valley National Park. SR-127 runs north–south through the valley and loosely follows the Amargosa River. Part of the California Freeway and Expressway System, SR-127 is eligible for the State Scenic Highway System, but Caltrans has not designated it as a scenic highway.

State Route 136: SR-136 runs from Lone Pine to SR-190 along the northern edge of Owens Lake. This route is part of the California Freeway and Expressway System.

State Route 138: SR-138 begins at its junction with I-5 south of Gorman and ends at its junction with SR-18 south of Crestline in the San Bernardino Mountains. Between the Los Angeles–San Bernardino county line and I-15, SR-138 traverses mountainous and scenic terrain and connects with SR-2, which leads to the San Gabriel Mountains winter resort areas. This route is part of the California Freeway and Expressway System, and is eligible for the State Scenic Highway System.

State Route 177: SR-177 runs north–south between I-10 near Desert Center and SR-62. SR-177 proceeds along the eastern portion of Joshua Tree National Park. SR-177, like the eastern 100 miles of SR-62, passes through some of the most desolate areas of the Mojave Desert.

State Route 178: SR-178 is in two constructed segments. The gap in between these segments is connected by various local roads and SR-190 through Death Valley National Park. The western segment of SR-178 begins at SR-99 west of downtown Bakersfield and ends near Ridgecrest at the turnoff for the Trona Pinnacles National Natural Landmark. The eastern segment of SR-178 begins in the southeastern part of Death Valley National Park and ends at the Nevada border, where it becomes Nevada SR-372. This route is part of the California Freeway and Expressway System and is eligible for the State Scenic Highway System.

State Route 186: SR-186 connects I-8 with the U.S.–Mexico border near the Colorado River. Its southern terminus is near Los Algodones, Baja California, and its northern terminus is near Winterhaven, California. It runs through the center of the Fort Yuma–Quechan Reservation.

State Route 190: SR-190 is split into two parts by the Sierra Nevada. The western portion begins at a junction with SR-99 south of Tipton and ends at Quaking Aspen in the Sequoia National Forest. The eastern portion, which runs through Death Valley National Park, begins at U.S. 395 at Olancha and ends at SR-127 at Death Valley Junction. The Golden Trout Wilderness and South Sierra Wilderness are two protected wilderness areas along the route from Quaking Aspen across the Sierra Nevada to Olancha.

The route east of SR-136 near Keeler is on the California Freeway and Expressway System. Except west of SR-65 in Porterville, SR-190 is eligible for the State Scenic Highway System; the part within Death Valley National Park, known as the Death Valley Scenic Byway, has been added to the system and is a National Scenic Byway. More information about this designation can be found in Chapter III.20, Visual Resources.

State Route 247: SR-247 begins in Yucca Valley and ends at Main Street in Barstow, a short distance north of I-15. This route is part of the California Freeway and Expressway System, and is eligible for the State Scenic Highway System.

III.19.2.3 Local Roads

Many county and city maintained roadways cross the DRECP area. Given the programmatic nature of this document and the number of local roadways throughout the DRECP area, it is not possible to list them all here; however, local roads would likely be used during construction and operations of some renewable development. A brief overview of the miles of county maintained roads throughout the DRECP area is presented below.

Imperial County Public Works is responsible for maintaining approximately 2,555 miles of county roads (1,349 paved and 1,206 unpaved). Inyo County's regional roadway network comprises over 3,500 miles of streets, roads and highways. The roadway network includes paved and dirt roadways owned by the National Park Service, U.S. Forest Service, Bureau of Indian Affairs jurisdiction and BLM. Kern County has about 6,300 miles of highway, road, and urban streets, of which the county maintains approximately 55%. Los Angeles County maintains over 3,100 miles of major roads and local streets in unincorporated areas. Riverside County is responsible for approximately 2,600 miles of roads located within the unincorporated areas of the county. San Bernardino maintains approximately 2,767 miles of roadways. San Diego is responsible for nearly 2,000 miles of county roads.

III.19.2.4 Railroads

The California Public Utilities Commission (CPUC) has regulatory and safety oversight over railroads and rail crossings in California.

Burlington Northern Santa Fe Railway

The Burlington Northern Santa Fe Railway (BNSF) is the second-largest freight railroad network in North America (Union Pacific is the largest). The company operates three transcontinental routes that link the western and eastern United States. The Southern Transcontinental runs from Los Angeles to Chicago. In 2008, BNSF completed nearly 16 miles of a third main track through Cajon Pass in Southern California, increasing capacity on the transcontinental main route between Chicago and Los Angeles from 100 to 150 trains per day.

A BNSF railway line runs east—west through the central part of the DRECP area, with a connecting line running south from Barstow to Los Angeles.

Union Pacific Railroad

The UPRR is the largest railroad network in the United States. UPRR's route map covers most of the central and western United States west of Chicago and New Orleans. A UPRR line enters the central part of the DRECP area, paralleling SR-58, then turns south where it meets with SR-14. From there, the line continues southeast across the DRECP area where it meets with I-8 and enters Arizona. Another UPRR line enters the DRECP area from Nevada near I-15. The line continues southwest through Mojave National Park and on to Barstow where it meets a BNSF line. Five linear miles of the UPRR line runs through the CDCA outside of the DRECP area.

III.19.2.5 BLM Routes of Travel

As noted in Volume II, Section II.3.4.2, the BLM Instruction Memorandum No. 2006-173 defines transportation assets as follows:

- **Road:** A linear route declared a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use. These may include ROW roads granted by the BLM to other entities.
- **Primitive Road:** A linear route managed for use by four-wheel drive or high-clearance vehicles. These routes do not normally meet any BLM road design standards.
- **Trail:** A linear route managed for human-powered, stock, or OHV forms of transportation or for historical or heritage values. Trails are not generally managed for use by four-wheel drive or high-clearance vehicles.

Designated Roads, Primitive Roads, and Trails are categorized as follows:

- **Tier 1:** Roads and Primitive Roads with high values for commercial, recreational, casual uses, and/or to provide access to other recreation activities.
- **Tier 2:** Roads and Primitive Roads with high values for recreation and other motorized access (i.e., important through routes).
- **Tier 3:** Primitive Roads and Trails with high value for motorized and nonmotorized recreational pursuits (i.e., spur routes).

Table III.19-1 shows the miles of BLM routes within the DRECP by ecoregion subarea.

Table III.19-1
Miles of BLM Routes by Ecoregion Subarea

Ecoregion Subarea	BLM Routes (Miles)
Cadiz Valley and Chocolate Mountains	2,000
Imperial Borrego Valley	800
Kingston and Funeral Mountains	1,000
Mojave and Silurian Valley	900
Owens River Valley	400
Panamint Death Valley	700
Pinto Lucerne Valley and Eastern Slopes	1,000
Piute Valley and Sacramento Mountains	90
Providence and Bullion Mountains	1,000
West Mojave and Eastern Slopes	2,000
Total	**11,000**

Notes: All measurements derived from best available data. Some of the areas may overlap due to mapping.
The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

III.19.2.6 Existing Renewable Energy Projects

The baseline includes more than 50 renewable energy projects under construction or nearly completed within the DRECP area (See Figure III.1-2[a] and Figure III.1-2[b] in Chapter III.1, Introduction to Affected Environment, and Appendix O, Table 2). These existing projects and those under construction have impacted the road network as workers and shipments move to and from the projects, so traffic from these projects is considered part of the current affected environment.

III.19.3 Transportation by Ecoregion Subarea

III.19.3.1 Cadiz Valley and Chocolate Mountains Ecoregion Subarea

Table III.19-2 and Figure R1.19-1 (in Appendix R1) show the federal and state routes that traverse the Cadiz Valley and Chocolate Mountains ecoregion subarea.

Table III.19-2
Transportation in the Cadiz Valley and Chocolate Mountains Ecoregion Subarea

Transportation Infrastructure	Linear Miles
Federal Highways	
I-10	62
U.S. 95	57
State Routes	
SR-62	72
SR-78	47
SR-177	27
BLM Routes of Travel	*1,877*

As shown in Figure R1.19-1, I-10 traverses the central portion of the Cadiz Valley and Chocolate Mountains ecoregion subarea. U.S. 95 and SR-78 intersect with I-10 from the south near Blythe (eastern portion of the ecoregion subarea), and SR-177 intersects from the north in the western portion of the ecoregion subarea south of Joshua Tree National Park. SR-62 traverses the northern portion of the ecoregion subarea. With the exception of Blythe, the Cadiz Valley and Chocolate Mountains ecoregion subarea is sparsely populated.

Blythe Airport is the only public airport in the Cadiz Valley and Chocolate Mountains ecoregion subarea. The airport, which has two runways and is mostly used for general aviation, is west of Blythe and serves Riverside County.

III.19.3.2 Imperial Borrego Valley Ecoregion Subarea

Table III.19-3 and Figure R1.19-2 show the federal and state routes and major railways that traverse the Imperial Borrego Valley ecoregion subarea.

Table III.19-3
Transportation in the Imperial Borrego Valley Ecoregion Subarea

Transportation Infrastructure	Linear Miles
Federal Highways	
I-8	88
State Routes	
SR-78	84
SR-86	45
SR-98	55
SR-111	67
SR-186	1
BLM Routes of Travel	*753*
Railways	
UPRR	106

As shown in Figure R1.19-2, I-8 and SR-98 both traverse the southern portion of the Imperial Borrego Valley ecoregion subarea. SR-78 traverses the central-northern portion of the ecoregion subarea. SR-86 and SR-111 both run north–south from near Calexico. Where SR-111 intersects with the UPRR line, it turns and runs parallel to the west. A portion of SR-186 intersects with I-8 at the extreme southeastern portion of the ecoregion subarea. These routes serve the greater El Centro and Imperial Valley areas.

Four airports serve the Imperial Borrego Valley ecoregion subarea as well. Brawley Municipal Airport is a public airport just northeast of Brawley, serving Imperial County. The airport is mostly used for general aviation. Calexico International Airport is a city-owned, public-use airport near Calexico. The airport, which covers an area of 257 acres, is mostly used for general aviation and to facilitate border crossing. Imperial County Airport (or Boley Field) is a public airport near El Centro covering an area of 429 acres. Imperial County Airport has two runways and is mostly used for general aviation, but is served by one commercial airline. Naval Air Facility (NAF) El Centro is a military airport six miles northwest of El Centro. The facility has two operating runways. Apart from "touch and go" landings and take-offs, aircrews use the many ranges at NAF El Centro for aerial combat maneuvering, air-to-air gunnery, bombing practice, and electronic warfare training.

III.19.3.3 Kingston and Funeral Mountains Ecoregion Subarea

Table III.19-4 and Figure R1.19-3 show the federal and state routes and major railways that traverse the Kingston and Funeral Mountains ecoregion subarea. There are no public airports in this ecoregion subarea.

Table III.19-4
Transportation in the Kingston and Funeral Mountains Ecoregion Subarea

Transportation Infrastructure	Linear Miles
Federal Highways	
I-15	44
State Routes	
SR-127	51
SR-178	76
SR-190	18
BLM Routes of Travel	*1,414*
Railways	
UPRR	77

As shown in Figure R1.19-3, I-15 and UPRR both traverse the eastern portion of the Kingston and Funeral Mountains ecoregion subarea. SR-127 enters the ecoregion subarea on the east at Mojave National Preserve, exits, and then re-enters in the central portion, where it intersects with SR-178. SR-190 enters the ecoregion subarea from the western portion at Death Valley National Park. These routes provide access to Mojave National Preserve, Death Valley National Park, and East Mojave National Scenic Area. The Kingston and Funeral Mountains ecoregion subarea is sparsely populated.

III.19.3.4 Mojave and Silurian Valley Ecoregion Subarea

Table III.19-5 and Figure R1.19-4 show the federal and state routes and major railways that traverse the Mojave and Silurian Valley ecoregion subarea.

Table III.19-5
Transportation in the Mojave and Silurian Valley Ecoregion Subarea

Transportation Infrastructure	Linear Miles
Federal Highways	
I-15	66
I-40	16
U.S. 395	9
State Routes	
SR-127	39
BLM Routes of Travel	*897*
Railways	
BNSF	21
UPRR	86

As shown in Figure R1.19-4, I-15 traverses the southern portion of the Mojave and Silurian Valley ecoregion subarea, south of Fort Irwin and north of the Barstow-Daggett Airport. I-40 also runs through the southern portion of the ecoregion subarea, south of both I-15 and the airport. SR-127 traverses the eastern portion of the ecoregion subarea and intersects with I-15. Although Fort Irwin is served by these routes (primarily I-15), none provides direct access. BNSF and UPRR both traverse the southern portion of the Mojave and Silurian Valley ecoregion subarea, roughly paralleling I-40 and I-15, respectively.

Barstow–Daggett Airport, a county-owned, public-use airport in San Bernardino County, California, is the only public airport in the Mojave and Silurian Valley ecoregion subarea. Barstow–Daggett Airport covers an area of 1,087 acres.

III.19.3.5 Owens River Valley Ecoregion Subarea

Table III.19-6 and Figure R1.19-5 show the federal and state routes that traverse the Owens River Valley ecoregion subarea. There are no railways or public airports in this ecoregion subarea.

Table III.19-6
Transportation in the Owens River Valley Ecoregion Subarea

Transportation Infrastructure	Linear Miles
Federal Highways	
U.S. 395	80
State Routes	
SR-136	18
SR-190	16
BLM Routes of Travel	*380*

As shown in Figure R1.19-5, U.S. 395 traverses the length of the Owens River Valley ecoregion subarea, running north–south. SR-136 and SR-190 both intersect with U.S. 395 from the east in the central portion of the ecoregion subarea.

III.19.3.6 Panamint Death Valley Ecoregion Subarea

Table III.19-7 and Figure R1.19-6 show the federal and state routes that traverse the Panamint Death Valley ecoregion subarea. There are no railways or public airports in the ecoregion subarea.

Table III.19-7
Transportation in the Panamint Death Valley Ecoregion Subarea

Transportation Infrastructure	Linear Miles
Federal Highways	
U.S. 395	7
State Routes	
SR-178	56
SR-190	61
BLM Routes of Travel	*739*

As shown in Figure R1.19-6, U.S. 395 runs north–south through the southwestern corner of the Panamint Death Valley ecoregion subarea. SR-178 traverses the length of both sections of the ecoregion subarea, and SR-190 runs roughly east–west through the tip of the western section and into the eastern section of the ecoregion subarea. These routes provide access to Death Valley National Park and serve the Ridgecrest area, which is adjacent to the ecoregion subarea. The Panamint Death Valley ecoregion subarea is sparsely populated.

III.19.3.7 Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

Table III.19-8 and Figure R1.19-7 show the federal and state routes and major railways that traverse the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea.

Table III.19-8
Transportation in the Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

Transportation Infrastructure	Linear Miles
Federal Highways	
I-15	13
State Routes	
SR-18	30
SR-62	37
SR-247	62
BLM Routes of Travel	*1,532*
Railways	
BNSF	2

As shown in Figure R1.19-7, I-15 enters the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea on the west, near Victorville and the Apple Valley Airport. SR-247 enters the ecoregion subarea from the northwest and east of the airport and intersects with

SR-18, which enters the ecoregion subarea from the southwest. SR-62 traverses the south-central portion of the ecoregion subarea, from around Twentynine Palms airport and through Twentynine Palms and Yucca Valley, all of which are north of Joshua Tree National Park. The BNSF line enters the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea for a brief stretch on its extreme western edge.

There are two public airports in the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea. Apple Valley Airport is a public airport north of Apple Valley and serving San Bernardino County. This airport has two runways and is mostly used for general aviation. Twentynine Palms Airport is a public-use airport east of Twentynine Palms and is owned by San Bernardino County. Twentynine Palms Airport covers an area of 480 acres and is mostly used for general aviation.

III.19.3.8 Piute Valley and Sacramento Mountains Ecoregion Subarea

Table III.19-9 and Figure R1.19-8 show the federal routes and major railways that traverse the Piute Valley and Sacramento Mountains ecoregion subarea. There are no state routes in the ecoregion subarea.

Table III.19-9
Transportation in the Piute Valley and Sacramento Mountains Ecoregion Subarea

Transportation Infrastructure	Linear Miles
Federal Highways	
I-40	36
U.S.-95	61
BLM Routes of Travel	*677*
Railways	
BNSF	46

As shown in Figure R1.19-8, I-40 and the BNSF line traverse the northern portion of the Piute Valley and Sacramento Mountains ecoregion subarea. U.S. 95 runs the entire length of the ecoregion subarea, crossing the BNSF line and intersecting with I-40 in the northern portion of the ecoregion subarea. These routes serve the Needles area.

Needles Airport, a county-owned, public-use airport near Needles in San Bernardino County, is the only public airport in the Piute Valley and Sacramento Mountains ecoregion subarea. The airport, which covers an area of 796 acres, is mostly used for general aviation.

III.19.3.9 Providence and Bullion Mountains Ecoregion Subarea

Table III.19-10 and Figure R1.19-9 show the federal and state routes and major railways that traverse the Providence and Bullion Mountains ecoregion subarea. There are no public airports in the ecoregion subarea.

Table III.19-10
Transportation in the Providence and Bullion Mountains Ecoregion Subarea

Transportation Infrastructure	Linear Miles
Federal Highways	
I-40	125
State Routes	
SR-62	27
BLM Routes of Travel	*1,338*
Railways	
BNSF	148

As shown in Figure R1.19-9, I-40 traverses the central portion of the Providence and Bullion Mountains ecoregion subarea, south of Mojave National Preserve and running roughly parallel with the BNSF railway in the western portion of the ecoregion subarea. SR-62 runs through the extreme southern portion of the ecoregion subarea, north of Joshua Tree National Park.

III.19.3.10 West Mojave and Eastern Slopes Ecoregion Subarea

Table III.19-11 and Figure R1.19-10 show the federal and state routes and major railways that traverse the West Mojave and Eastern Slopes ecoregion subarea.

Table III.19-11
Transportation in the West Mojave and Eastern Slopes Ecoregion Subarea

Transportation Infrastructure	Linear Miles
Federal Highways	
I-15	37
I-40	7
U.S. 395	98
State Routes	
SR-14	94
SR-18	28
SR-58	106

Table III.19-11
Transportation in the West Mojave and Eastern Slopes Ecoregion Subarea

Transportation Infrastructure	Linear Miles
SR-138	68
SR-178	36
BLM Routes of Travel	*2,033*
Railways	
BNSF	165
UPRR	118

As shown in Figure R1.19-10, I-15 enters the West Mojave and Eastern Slopes ecoregion subarea from the south and runs north to where it intersects and merges with I-40 near Barstow. U.S. 395 traverses the entire length of the ecoregion subarea and crosses the BNSF, which traverses the central portion of the ecoregion subarea. Near the Mojave Airport, the BNSF line merges with the UPRR line, which enters from the south. The BNSF line also intersects with the UPRR line near Hesperia in the southeastern corner of the ecoregion subarea. SR-18 and SR-138 both traverse the southern portion of the ecoregion subarea. SR-14, like U.S. 395, runs the length of the ecoregion subarea and runs parallel to the UPRR from around Palmdale to near the Mojave Airport. SR-58 then intersects from the west and continues east, parallel to the BNSF line. SR-178 enters the northern portion of the ecoregion subarea from the west, near the Inyokern Airport. Most of the West Mojave and Eastern Slopes ecoregion subarea is populated and served by these routes.

Six public airports are in the West Mojave and Eastern Slopes ecoregion subarea. General William J. Fox Airfield (or Fox Field) in Lancaster, California, serves the Antelope Valley region of northern Los Angeles County. Although the airport is used primarily for general aviation, there are limited scheduled cargo operations, and the U.S. Forest Service maintains an air-tanker base at this airport, making it one of the principal hubs of firefighting during fire season. An Antelope Valley Hospital helicopter is also based at Fox Field. General William J. Fox Airfield covers 1,217 acres and has one runway.

Hesperia Airport is a public-use airport near Hesperia, California. The airport, which covers an area of 26 acres, is mostly used for general aviation.

Inyokern Airport is a public airport in Inyokern, California, and serves the Indian Wells Valley area of Kern County. It is owned by the Indian Wells Valley Airport District. The airport, which covers an area of 1,640 acres, is mostly used for general aviation, but is served by one commercial airline.

The Mojave Air and Space Port (or Civilian Aerospace Test Center) is in Mojave, California. Besides being a general-use public airport, Mojave has three main areas of activity: flight testing, space industry development, and aircraft heavy maintenance and storage.

Southern California Logistics Airport (or Victorville Airport) is a public airport in Victorville, California, approximately 20 miles north of San Bernardino. The airport, which covers 2,300 acres, is home to Southern California Aviation, a large transitional facility for commercial aircraft.

Tehachapi Municipal Airport is a public airport in Tehachapi, California. The airport, which covers 264 acres, has one runway and is used for general aviation.

III.19.4 CDCA Area Outside the DRECP Boundary

The BLM LUPA includes BLM-administered lands under the CDCA Plan, but outside the DRECP area. Table III.19-12 shows transportation facilities in the area affected by BLM LUPA decisions.

Table III.19-12
Transportation Within the CDCA Area Outside the DRECP Boundary

Transportation Infrastructure	Linear Miles
Federal Highways	26
State Routes	25
BLM Routes of Travel	[routes outside of DRECP area not available]
Railroads	5
Airports	—

III.19.5 Transportation Outside of DRECP Area

The federal and state regulatory setting presented in Sections III.19.1.1 and III.19.1.2 applies to the transmission corridors extending outside of the DRECP area. Additionally, BNSF and UPRR railways are the only known rail lines near the transmission corridors. Information about these railroads is provided in Section III.19.2.3 for the entire region. The following discussion provides environmental setting information on roadways along each corridor.

III.19.5.1 San Diego Area

Federal highways near the corridor in San Diego include I-8 (see Section III.19.2.1.1) and I-15 (see Section III.19.2.1.3). California state routes near this corridor include SR-52, SR-67, and SR-125.

State Route 52: SR-52 is a state highway in San Diego County that extends from La Jolla Parkway at I-5 in La Jolla to SR-67 in Santee. SR-52 is a freeway for its entire length and serves as a major east–west route through the northern part of the city of San Diego. The road connects the major north–south freeways of the county, including I-5, I-805, SR-163, I-15, SR-125, and SR-67.

State Route 67: SR-67 is a state highway in San Diego County. It begins at I-8 in El Cajon and continues to Lakeside as the San Vicente Freeway before becoming an undivided highway through the eastern part of Poway. In the town of Ramona, the route turns into Main Street before ending at SR-78. SR-67 provides direct access from the city of San Diego to the east county region of San Diego County, including Ramona and Julian.

State Route 125: SR-125 runs from Otay Mesa Road (formerly SR-905) in the Otay Mesa region of San Diego County near the U.S.–Mexico border to SR-52 in Santee.

III.19.5.2 Los Angeles Area

Federal highways near the corridor in Los Angeles include I-10 (see Section III.19.2.1.2), as well as I-5 and I-210. U.S. routes along this corridor include U.S. 101. State routes near this corridor include SR-2, SR-134, SR-170, and SR-210 (same as I-210).

Interstate 5: Where I-5 reaches east of downtown Los Angeles, it continues north through the San Fernando Valley and then crosses the Newhall Pass through the Santa Susana Mountains into the Santa Clarita Valley. For about a 4-mile stretch between Santa Clarita Valley and Pyramid Lake, the northbound and southbound lanes separate and cross sides, with the southbound lanes running to the east of the northbound lanes. At that point, the Golden State Freeway rises sharply to the north through the Grapevine to the southernmost point of the San Joaquin Valley toward Bakersfield.

Interstate 210 and State Route 210: I-210 and SR-210 together form a contiguous highway, called the Foothill Freeway, running through the greater Los Angeles area. The western portion of the route is an auxiliary Interstate Highway, and the eastern portion is a state highway. The entire route was upgraded to Interstate Highway standards by 2007, and Caltrans has requested permission to re-sign the eastern portion as an Interstate Highway. The freeway connects Los Angeles with its northern suburbs following the foothills of the San Gabriel Mountains. The freeway runs from the Sylmar district of Los Angeles east to Redlands.

U.S. 101: U.S. 101 serves the northwest portion of the greater Los Angeles area. The route is known as the Santa Ana Freeway from East Los Angeles to downtown Los Angeles. It becomes the Hollywood Freeway north of downtown Los Angeles through the Cahuenga Pass, before turning west and becoming the Ventura Freeway. Communities along the

alignment include Hollywood, the southern edge of the San Fernando Valley, and the cities of Hidden Hills, Calabasas, Agoura Hills, Westlake Village, and Thousand Oaks. Through this segment, U.S. 101 is a freeway varying in width between 8 and 12 lanes.

State Route 2: SR-2 runs from the junction of Lincoln Boulevard and I-10 in Santa Monica to SR-138 east of Wrightwood. The highway is divided into three segments, running briefly concurrent with U.S. 101 and I-210 to connect the segments. The western section of the highway is an old routing of U.S. 66; the eastern portion is known as the Angeles Crest Highway.

State Route 134: SR-134 is the principal east–west route (designated north–south) through Ventura County and in the southern San Fernando Valley in Los Angeles County. From Ventura to its intersection with U.S. 101 in the southeastern San Fernando Valley in Los Angeles, it is signed as U.S. 101. East of the U.S. 101 intersection, it is signed as SR-134.

State Route 170: SR-170 is a California State Highway in the city of Los Angeles that runs in a north–south direction. It is composed of two distinct sections. The first is the part of Highland Avenue that starts from Santa Monica Boulevard and ends at U.S. 101. The second is the northern portion of the Hollywood Freeway, starting at the intersection of U.S. 101 and SR-134 and continuing to its terminus at I-5.

III.19.5.3 North Palm Springs–Riverside Area

Federal highways near the corridor in the Rialto/Moreno Valley/Devers Area include I-110 (see Section III.19.2.1.2), I-15 (Section III.19.2.1.3), and I-210. State routes near this corridor include SR-62 (Section III.19.2.2.4), SR-60, SR-79, and SR-243.

State Route 60: The Pomona Freeway is the assigned name of SR-60 between its western terminus at the east Los Angeles Interchange complex and its junction with the Riverside Freeway (SR-91) and I-215 in Riverside. For the majority of its length, it is generally parallel to, and south of, I-10, and generally parallel to, and north of, SR-91.

State Route 79: The portion of SR-79 north of Temecula (to Beaumont) varies between a 2-lane country road (notably near Winchester) and a 4-lane city street (in Temecula, Murrieta, Hemet, San Jacinto, and Beaumont), with a 4-lane divided highway between the Ramona Expressway (at the northwest corner of San Jacinto) and the southern edge of Beaumont. The highway section has two access points: a signaled T intersection for a county landfill facility and a set of highway ramps for Gilman Springs Road just north of the Ramona Expressway intersection. The northern portion of this roadway sometimes is referred to as the Ramona Expressway.

State Route 243: SR-243 is mainly a connector between I-10 and SR-74; however, along its route it provides access for many truck trails that run through San Bernardino National Forest. These truck trails provide access to smaller towns such as Pine Cove. The route is generally considered to be a minor throughway with the heaviest traffic near the Idyllwild segment of the highway. The rest of the highway is mostly a rural 2-lane segment until Banning and its terminus at I-10. This route is eligible for the State Scenic Highway System and is classified as a scenic highway in California.

III.19.5.4 Central Valley

Federal highways near the corridor in the Central Valley include I-5. State routes near this corridor include SR-33, SR-41, SR-46, SR-58, SR-99, SR-132, SR-140, SR-145, and SR-165. SR-99 is the major highway on the east side of the valley. SR-33 roughly parallels I-5 and the other state routes are cross-valley routes through agricultural land and valley towns and cities.

III.20 VISUAL RESOURCES

Visual resources include all human-made, natural, moving, and stationary objects and features that can be seen in a given landscape such as landforms and bodies of water. These resources either add to or detract from a landscape's beauty or visual appeal. Both daytime and nighttime lighting conditions affect the visual quality of landscapes.

Landforms, vegetation, water surfaces, and human-made physical changes all contribute to a landscape's visual qualities. A landscape's existing visual character is the baseline used to determine whether a proposed action would be either compatible or incompatible with that character. The public's expectations, goals, values, awareness, and concerns also inject a social dimension into this visual resource analysis. This social dimension helps determine both the visual sensitivity and the relative degree of public interest in a landscape, and therefore the public concern over potential changes to that landscape.

III.20.1 Regulatory Setting

III.20.1.1 Federal Land Policy and Management Act of 1976

The Federal Land Policy and Management Act of 1976 (FLPMA; 43 United States Code 1701) and the U.S. Department of the Interior's Bureau of Land Management (BLM) Land Use Planning Handbook (2005) both emphasize the importance of protecting the quality of scenic resources on public lands. FLPMA sections relevant to the Desert Renewable Energy Conservation Plan (DRECP) Proposed Land Use Plan Amendment (LUPA) are:

> Section 102(a): "The public lands [shall] be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values."
>
> Section 103(c): Identifies "scenic values" as resources for public management.
> Section 201(a): "The Secretary shall prepare and maintain on a continuing basis and inventory of all public lands and their resources and other values (including...scenic values)."
>
> Section 505(a): "Each right-of-way shall contain terms and conditions which will...minimize damage to the scenic and esthetic values."

FLPMA's legal mandate to protect the quality of scenic resources on public lands is carried out by BLM and detailed in BLM's Visual Resource Management (VRM) system, as described below.

III.20.1.2 Bureau of Land Management Visual Resource Inventory and Management Guidance

BLM, through FLPMA, is charged with protecting the scenic value of the public lands they administer. To accomplish this, BLM has developed and uses an analytical process—the VRM system—to identify, set, and maintain those scenic values. The VRM system has two key aspects: inventorying visual resources and managing those resources (BLM 1984[a]).

Through the Visual Resource Inventory (VRI) process, BLM identifies the visual resources of a given area and, based upon specific standards, assigns an inventory class to each area. This process, further described in detail in BLM Manual H-8410-1, Visual Resource Inventory (1984[b]), involves rating the resource's visual qualities, measuring public concern, and determining the extent to which an area is visible from travel routes and other observation points. Those three factors then determine which of VRI's four classes are assigned to each area of BLM-administered lands (Table III.20-1). These four VRI classes represent the relative values of the existing visual resources. VRI Classes I and II represent the highest visual value, Class III represents moderate value, and Class IV represents relatively low visual value. The four VRI classes are the foundation upon which BLM considers visual values in its management planning processes (discussed further in Section III.20.2.2). As shown in Table III.20.1, inventory classifications are based on visual sensitivity level (high, medium, and low), scenic quality, and distance.

Table III.20-1
Visual Resource Inventory Classification Matrix

Scenic Quality	VSL High	VSL High	VSL High	VSL Medium	VSL Medium	VSL Medium	VSL Low
Special Areas	I	I	I	I	I	I	I
A	II	II	II	II	II	II	II
B	II	III	III/IV	III	IV	IV	IV
C	III	IV	IV	IV	IV	IV	IV
Distance Zones	f/m	b	s/s	f/m	b	s/s	s/s

Source: BLM Manual H-8410-1 (BLM 1984b)
VSL – Visual Sensitivity Level
Key to Distance Zones:
f/m=foreground/middleground
b=background
s/s=seldom seen
If adjacent areas are Class III or lower, assign Class III; if higher, assign Class IV.

Using its VRM approach, BLM considers VRI values in the larger context of other management needs and decisions. The BLM then determines the appropriate visual resource management classes to assign to each specific geographic area.

Due to management considerations, the VRM class that BLM assigns to a given area does not always correspond to the area's VRI class assignment. For example, management decisions could result in a management class of VRM II assigned to a VRI Class III area.

In cases where VRM classes have not been designated in management plans, BLM assigns interim VRM classes on a project-specific basis through the permit approval process. VRM Class I is assigned to areas identified as VRI Class I, including wilderness, wilderness study areas (WSAs), and other locations where natural environments must not be altered by human actions, even where exceptional scenic values may be absent. Each of the VRM classes contains visual objectives ranging from preservation to the accommodation of major modifications. The classes therefore allow different degrees of modification to the basic landscape elements of form, line, color, and texture, among other elements.

The BLM-established management objectives for each VRM class appear in Table III.20-2.

Table III.20-2
Visual Resource Management Objectives by Class

Visual Resource Class	Visual Management Objective
Class I	The objective of this class is to **preserve** the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and **must not attract attention.**
Class II	The objective of this class is to **retain** the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but **should not attract the attention** of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
Class III	The objective of this class is to **partially retain** the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities **may attract attention,** but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
Class IV	The objective of this class is to provide for management activities which require **major modification** of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the **major focus of viewer attention.** In accordance with FLPMA section 302(f), any action necessary to prevent unnecessary and undue degradation to the lands is to be taken, such as, but not limited to, careful location, minimal disturbance, and repeating the basic elements.

Source: BLM Manual H-8410-1

III.20.1.3 Federal Aviation Administration Lighting Standards

The Federal Aviation Administration's (FAA) FAA Advisory Circular 70/7460-1K (2007) requires that all airspace obstructions higher than 200 feet or close to an airfield have appropriate lighting. Chapter 13 of the circular describes the requirements for marking and lighting wind turbines in wind farms that have three or more turbines with heights above 200 feet. General standards for lighting wind farms include (FAA 2007):

- Not all wind turbines require lighting.
- Obstruction lights within a group of wind turbines should have unlighted separations, or gaps, of not greater than half a statute mile to clearly define the group's dimensions and appearance. This is especially critical if their arrangement is linear.
- Wind turbine night lighting should be the preferred FAA L-864 aviation flashing red lights: the standard flashing range is 20-40 flashes per minute.
- Wind turbine daytime lighting is not required as long as the turbines are painted either a bright white or light off-white color.
- Light fixtures should be as high as possible on the turbine's housing cover (nacelle) so they can be clearly seen from all angles.
- When wind turbines are lined up in a straight, linear formation, a light should be placed on turbines at the end of each line.
- FAA is preparing changes to its *FAA Advisory Circular 70/7460-1K* that will specify audio visual warning systems (AVWS) as permissible options for meeting the established technical standards that identify air navigation obstructions (FAA 2009). The AVWS employs both lights and an audio warning to pilots. The system's lights and audio warning are off until activated by radar detecting an aircraft approaching the obstruction. FAA will accept, analyze, and approve an AVWS as an alternative to conventional lighting on a case-by-case basis.

Some transmission towers and towers used in particular types of thermal solar developments also require obstruction warning lighting. For very tall towers, this includes daytime strobe lighting as well as nighttime lighting.

III.20.2 Visual Resources within the Land Use Plan Amendment Decision Area

This section discusses known and potentially sensitive visual resources within the LUPA Decision Area including those identified in adopted plans and BLM field office inventories.

III.20.2.1 California Desert Conservation Area

The majority of the BLM land within the LUPA Decision Area is within the BLM's California Desert Conservation Area (CDCA). Title VI of FLPMA delineated the CDCA as a Designated Management Area. The balance of the BLM land is outside of the CDCA. The CDCA Plan's Multiple Use Class designations, established by BLM and described in Section III.14, considers visual sensitivity. The Multiple Use Class designations generally indicate where new development may be located and when mitigation may be required for visual impacts. Multiple Use Class guidelines in the Recreation Element of the CDCA Plan require that BLM consider visual resources, along with other resource objectives, when identifying levels of management and protection in the CDCA Plan area.

The Imperial Sand Dunes Recreation Area Management Plan (RAMP)/CDCA Plan Amendment established VRM classes for the Imperial Sand Dunes RAMP area within the CDCA. BLM has not otherwise formally established VRM classes for most of the CDCA.

III.20.2.2 Field Office Inventories

The BLM administers approximately 44% of the land within the LUPA Decision Area boundaries. All BLM land within the LUPA Decision Area has been inventoried in accordance with BLM's VRM process. Although VRM classifications are being considered through this LUPA planning process, they have not been assigned to all inventoried lands.

BLM uses the VRI process to determine visual (scenic) values within BLM-administered lands. This process contains a scenic quality evaluation (Figure III.20-1), sensitivity level analysis (Figure III.20-2), and a delineation of distance zones (Figure III.20-3). VRI Class I is assigned to areas where a federally binding decision has been made to maintain a natural landscape and includes national wilderness areas, WSAs, wild sections of national wild and scenic rivers, and other federally and otherwise administratively designated areas where natural landscapes are preserved. Except for VRI Class I, BLM assigns VRI classes (Figure III.20-4; Table III.20-3) in accordance with the VRI Classification Matrix described and shown in Section III.20.1.1.2. Section III.20.3 provides a summary of VRI class acreage by ecoregion subarea and CDCA Area outside the DRECP boundary.

In its 1993 Resource Management Plan (RMP), the BLM Bishop Field Office designated VRM classes and required that visual resources be aligned with their corresponding visual objectives (Figure III.20-5; Table III.20-3). In the Imperial Sand Dunes RAMP/CDCA Plan Amendment, the El Centro Field Office designated VRM classes for the recreation area (2013; Figure III.20-5).

In the Bakersfield Field Office 2014 RMP, VRM classes were designated. These designations are shown in Figure III.20-5. The following administrative action regarding visual resources was incorporated into the Bakersfield Field Office 2014 RMP:

- For all surface-disturbing projects or activities, regardless of size of potential impact, incorporate visual design considerations, consistent with the Visual Resource Contrast Rating Manual H-8431-1, to meet VRM class objectives of the area.

Table III.20-3
Summary of Visual Resources and Visually Important Management Units within the LUPA Decision Area

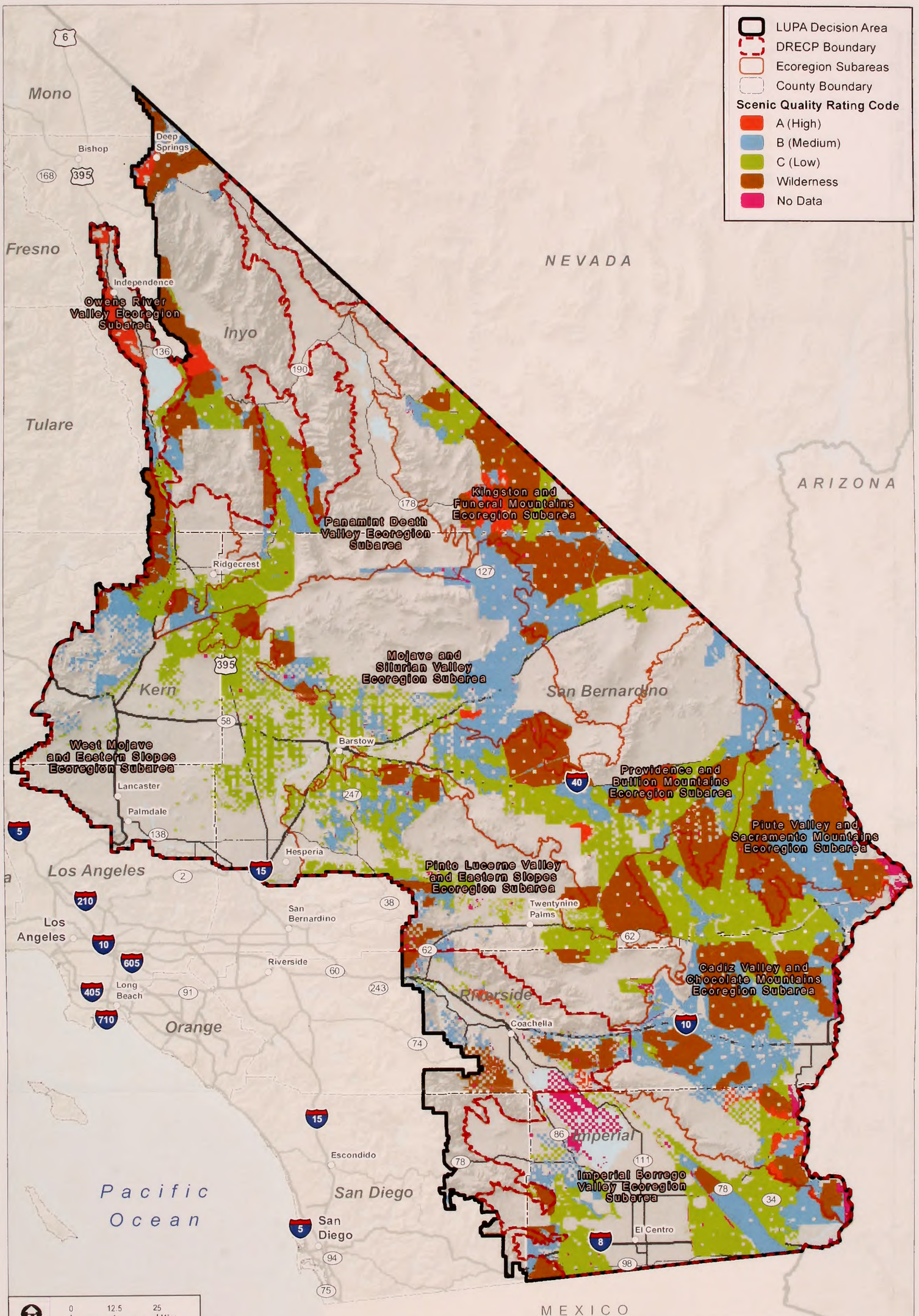
Category	Resource	Extent
BLM Visual Resource Inventory Classes	Class I	3,448,000 acres
	Class II	2,393,000 acres
	Class III	2,918,000 acres
	Class IV	1,986,000 acres
BLM Visual Resource Management Classes	Class I	3,861,000 acres
	Class II	128,000 acres
	Class III	148,000 acres
	Class IV	22,000 acres
National Parks and Preserves	Joshua Tree National Park	613,000 acres
	Death Valley National Park	1,786,000 acres
	Mojave National Preserve	1,589,000 acres
National Byways	Bradshaw Trail National Backcountry Byway	64.4 miles
National Trails	Juan Bautista De Anza National Historic Trail†	230 miles
	Old Spanish National Historic Trail	367 miles
	Pacific Crest National Scenic Trail	182 miles
National Historic Sites	Manzanar National Historic Site	800 acres
Wild and Scenic Rivers	Amargosa River	3 miles
	Mojave River	9 miles
	Surprise Canyon	4 miles

† Includes Recreational portions of the Anza Trail as well as the motor route

Acres shown for VRM include all WSAs and wilderness, which by BLM policy are assigned VRM Class I; as well as those lands for which VRM classes have been assigned by the Bishop and Bakersfield RMPs and by the Imperial Sand Dunes RAMP.

Acres are reported for BLM-managed lands only

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total in the table.



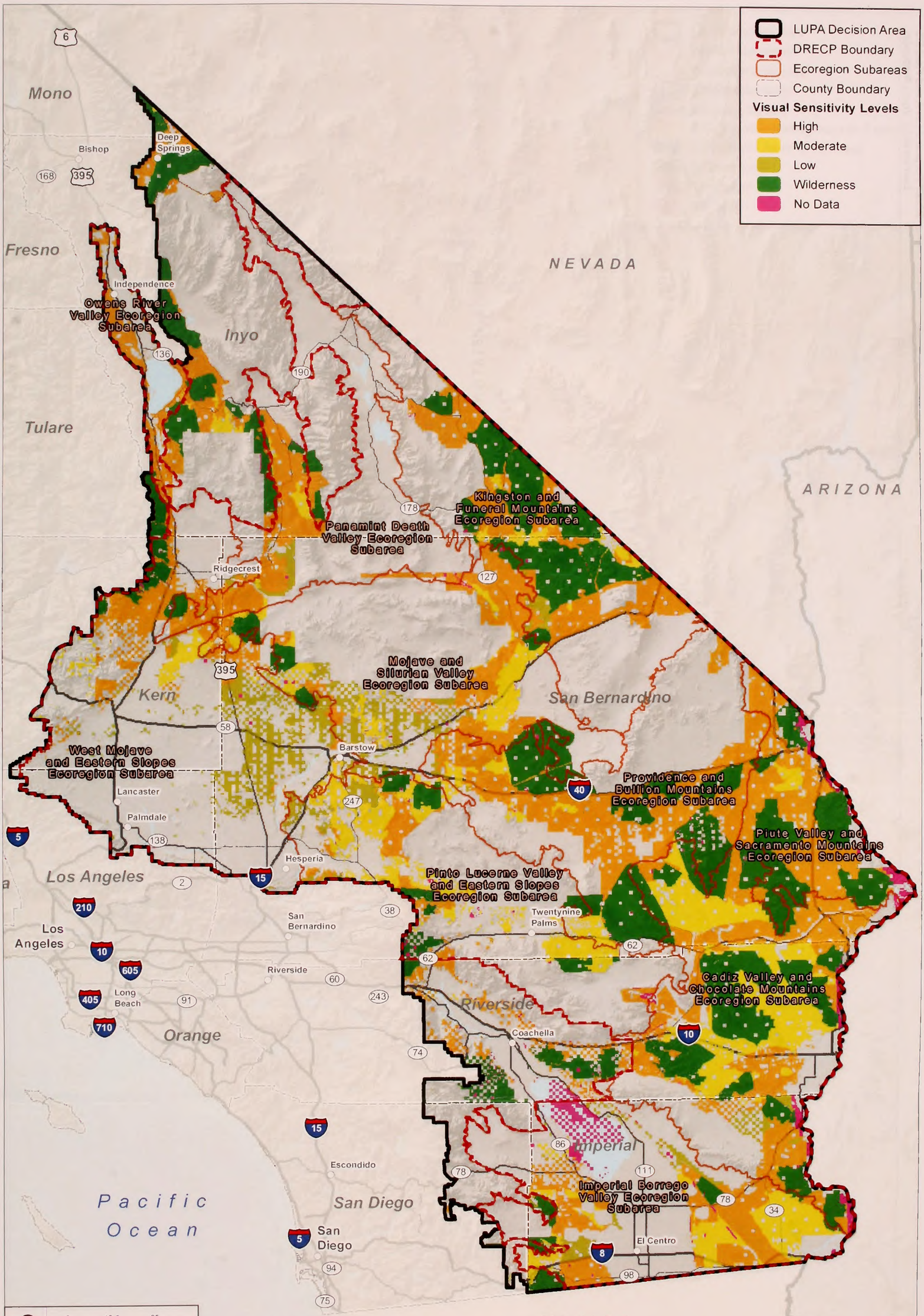
Sources: ESRI (2014); BLM (2015); RECON (2015)

FIGURE III.20-1

Scenic Quality Rating on BLM-Managed Lands

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Sources: ESRI (2014); BLM (2015); RECON (2015)

FIGURE III.20-2

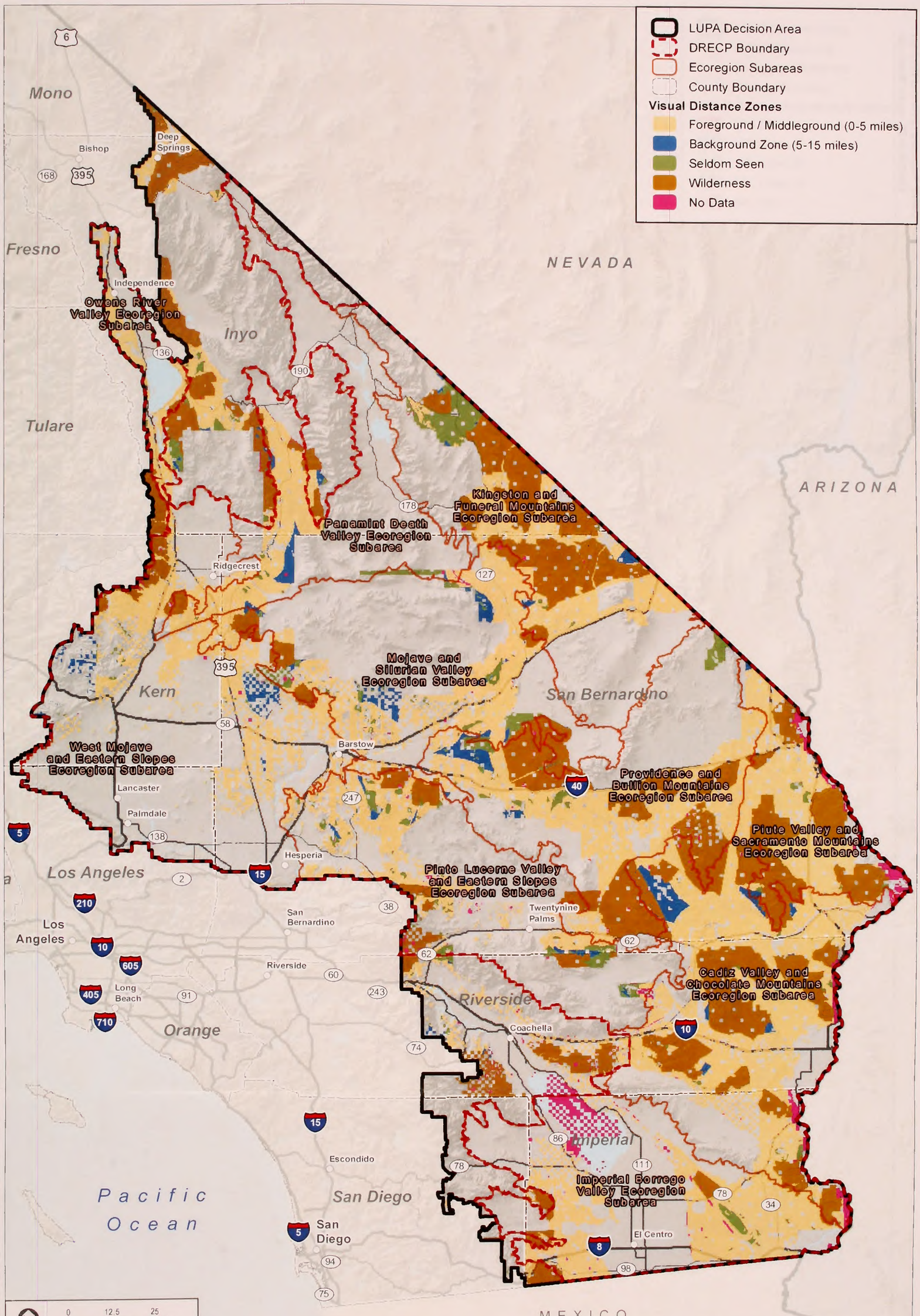
Visual Sensitivity Levels on BLM-Managed Lands

DRECP Proposed LUPA and Final EIS

October 2015

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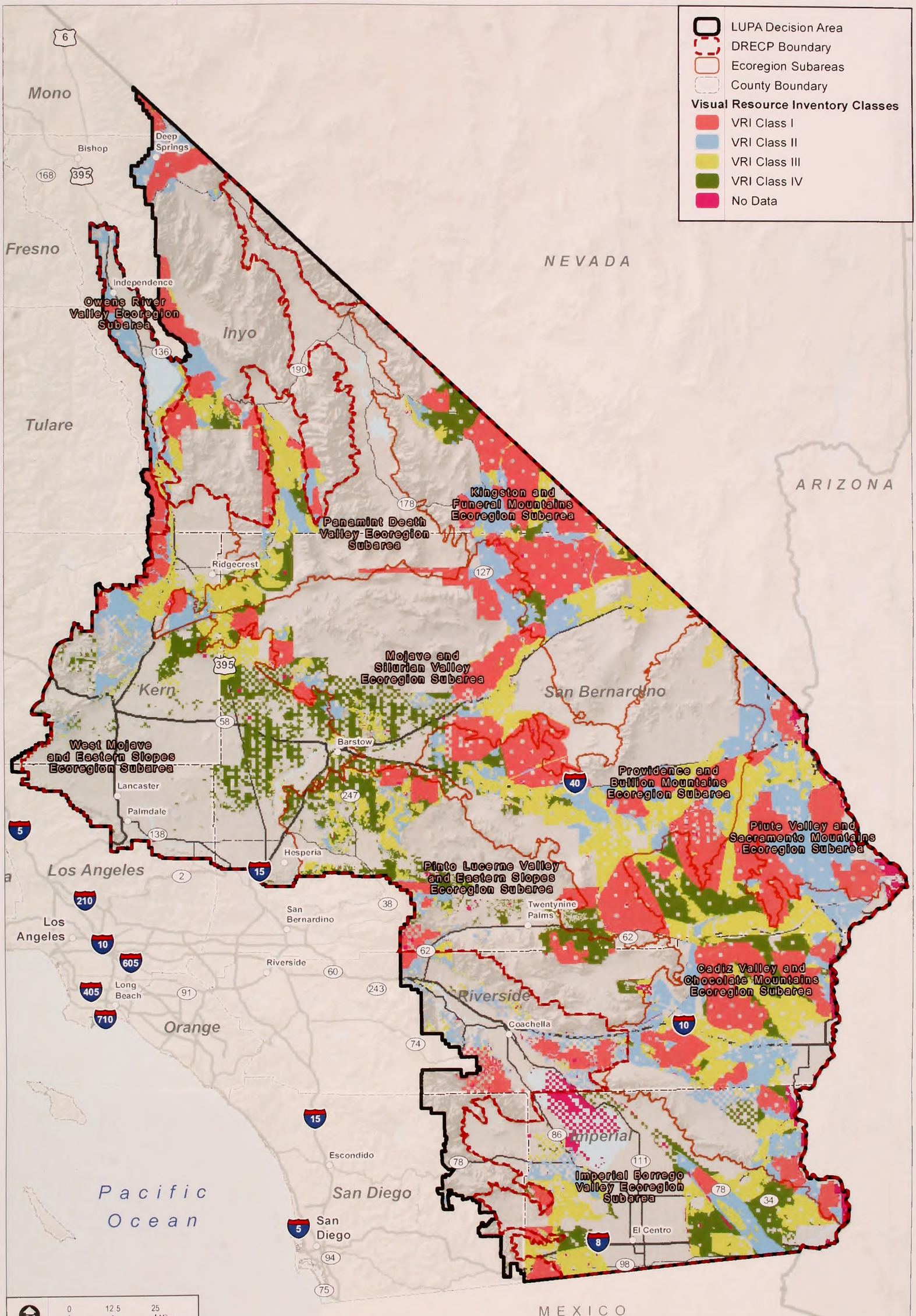
Sources: ESRI (2014), BLM (2015), RECON (2015)

FIGURE III.20-3

Visual Distance Zones on BLM-Managed Lands

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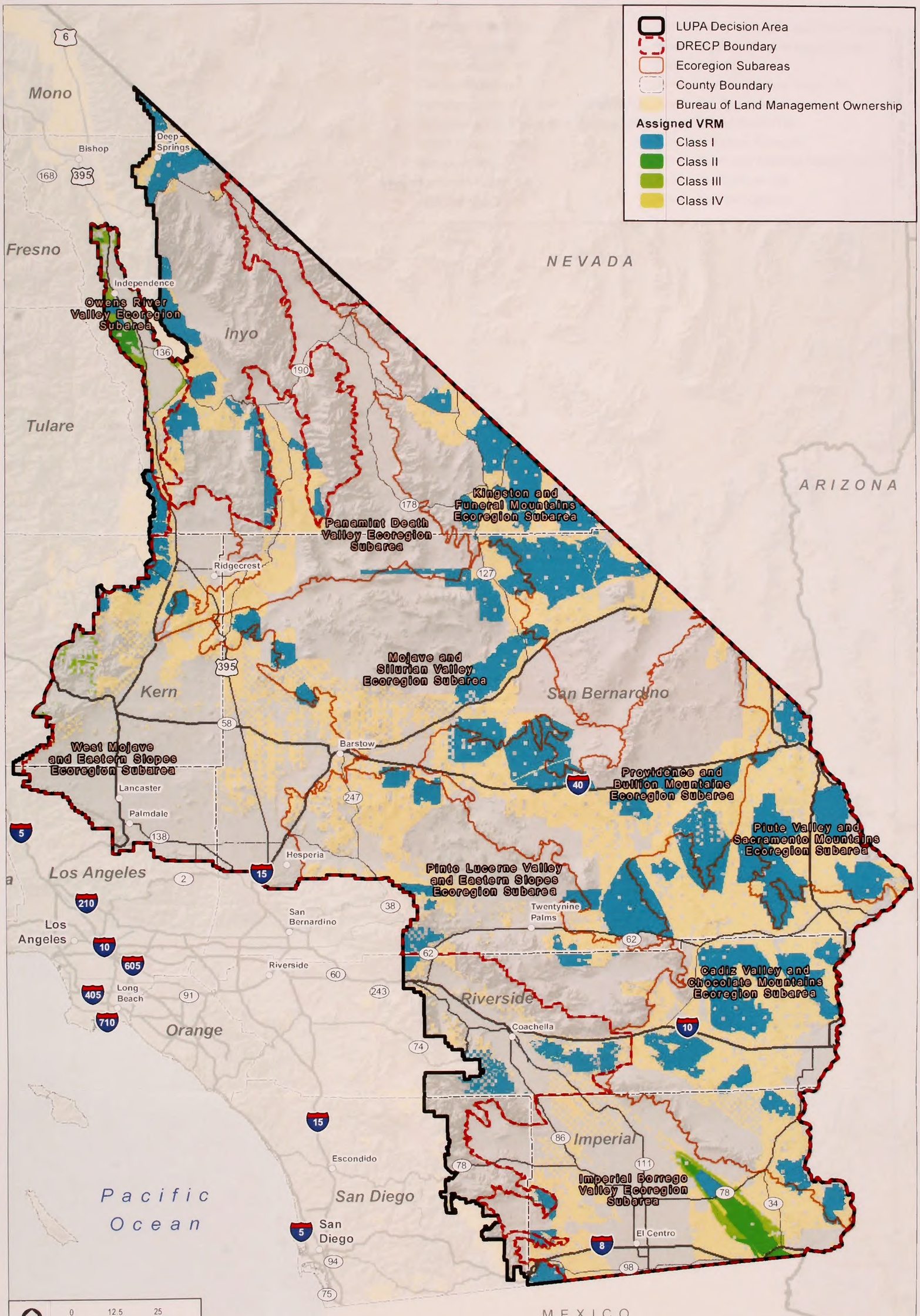


Sources: ESRI (2014); BLM (2015); RECON (2015)

FIGURE III.20-4

Visual Resource Inventory Classes on BLM-Managed Lands

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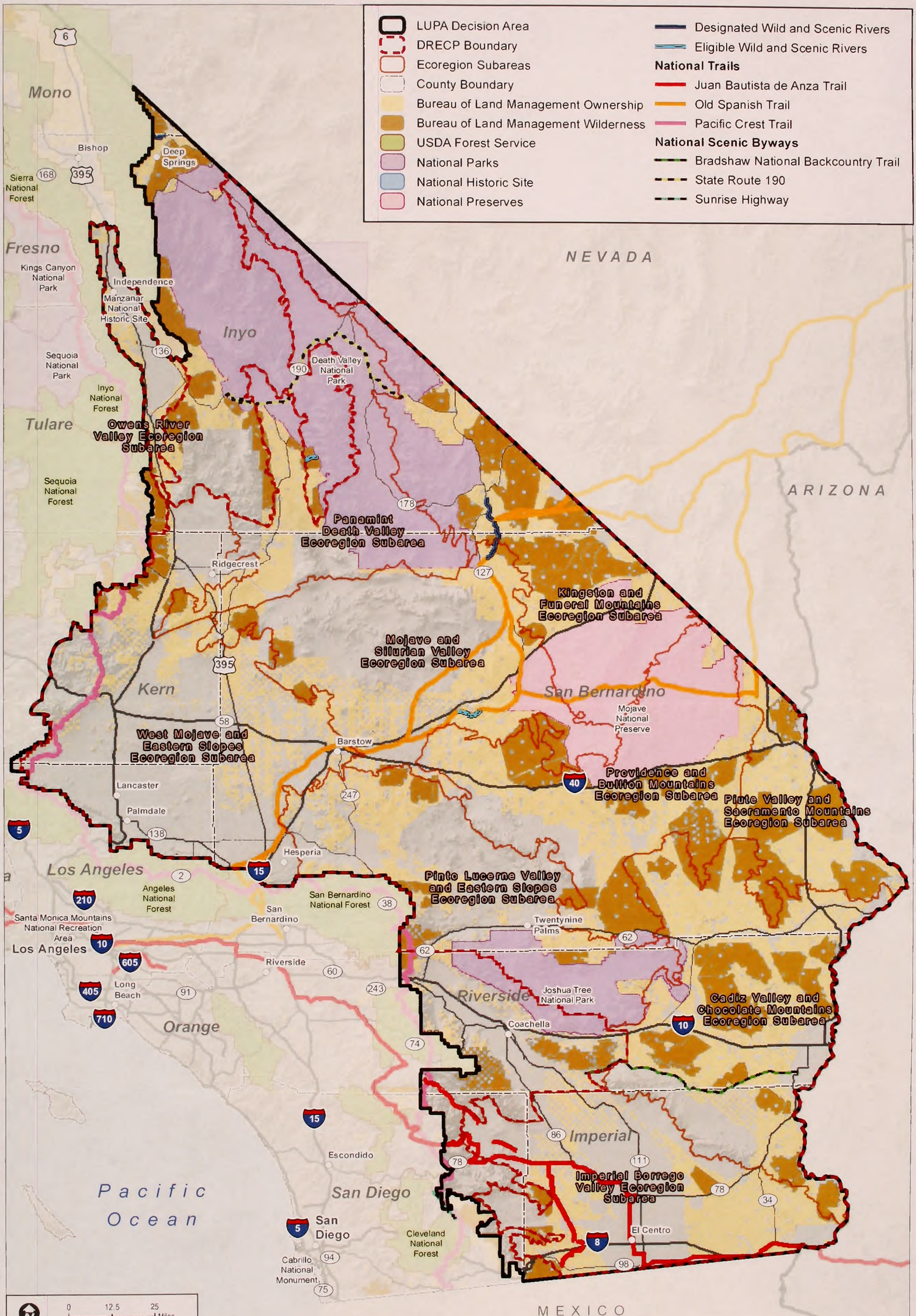
Sources: ESRI (2014); BLM (2015); RECON (2015)

FIGURE III.20-5

Assigned Visual Resource Management Classes on BLM-Managed Lands

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Sources: ESRI (2014); BLM (2015); RECON (2015)

FIGURE III.20-6

National Parks, Preserves, Forests, Trails and Scenic Byways

DRECP Proposed LUPA and Final EIS

October 2015

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III.20.2.3 National Landscape Conservation System

The BLM established the National Landscape Conservation System (NLCS) to conserve, protect, and restore nationally significant landscapes recognized for their outstanding cultural, ecological, and scientific values (BLM 2012). The NLCS includes national monuments, national conservation areas, wilderness, WSAs, wild and scenic rivers, national scenic and historic trails, and conservation lands of the California desert.

Although there are no national monuments or National Conservation Areas within the LUPA Decision Area, other NLCS areas that do occur are discussed in Chapter III.14 (BLM Land Designations). Included in Chapter III.14 is a detailed listing and map of wilderness and WSAs. A discussion of the visual resources of each wilderness and WSA is not included in this chapter, but is included in the tabulated acreages of visual resources considered.

A 23-mile section of the Amargosa River, designated as a Wild and Scenic River, is in the LUPA Decision Area. The Amargosa River is the only free-flowing river in the Mojave Desert's Death Valley region. The river and its surrounding natural areas are east of the southeastern corner of Death Valley National Park. The area is characterized by a rare and verdant riparian area with unobstructed views of the desert mountains and few human settlements. Segments of the Mojave River and the Surprise Canyon Creek are eligible for wild and scenic river designation. Wild and Scenic Rivers are discussed in Chapter III.14.

III.20.2.4 National Scenic Byways

The National Scenic Byways Program was established 1991 to recognize, preserve, and enhance selected roads throughout the United States. National scenic byways are recognized by the U.S. Secretary of Transportation based upon one or more archeological, cultural, historic, natural, recreational, or scenic qualities (Federal Highway Administration 2012).

A 64-mile section of the Bradshaw Trail National Backcountry Byway occurs in the LUPA Decision Area, primarily in the Cadiz Valley and Chocolate Mountains ecoregion subarea (Table III.20-3). Located in Southeastern Riverside County, with a small segment extending into Imperial County, this byway traverses mostly public land between the Chuckwalla Mountains and the Chocolate Mountains (Federal Highway Administration 2012).

III.20.2.5 National Scenic and Historic Trails

In 1968, Congress established the National Trails System. The BLM and the National Park Service (NPS) are two of several agencies responsible for the management of these trails. National historic trails closely follow an historic trail or nationally significant travel route. This national designation ensures that historic routes, associated historic remnants, and artifacts are identified and protected for public use and recreation (NPS 2012).

National Scenic or Historic Trails within the DRECP area include the Pacific Crest National Scenic Trail, the Juan Bautista de Anza National Historic Trail, and the Old Spanish National Historic Trail (Table III.20-3).

The Pacific Crest National Scenic Trail runs 2,650 miles between Mexico and Canada. The U.S. Forest Service (USFS), BLM, NPS, California State Parks, and the Pacific Crest Trail Association jointly administer it. The 1982 Pacific Trail Comprehensive Management Plan provides the overall strategy and guidance for managing the trail and its significant resources. Approximately 182 miles of the trail traverse the LUPA Decision Area in the Pinto and Lucerne Valley ecoregion subarea and the West Mojave and Eastern Slopes ecoregion subarea. Points along this scenic trail provide views to various parts of the LUPA Decision Area (NPS 2012[a]).

Approximately 1,210 miles of the Juan Bautista de Anza National Historic Trail cross southern Arizona and into California. Approximately 230 miles are in the LUPA Decision Area, mostly in the Imperial Borrego Valley ecoregion subarea. The Juan Bautista de Anza Comprehensive Management and Use Plan, published in 1996, protects this trail's rights-of-way and its cultural and scenic resources within the historic trail corridor. Additional goals include increasing public appreciation and understanding of the trail, encouraging facilities for resource protection and public information and use, and promoting the cooperative management of trail resources and programs. The trail commemorates the 1775-1776 Spanish Expedition, which traveled this route from Mexico to San Francisco. The path taken by the de Anza party is partially on privately owned lands, government military bases, and otherwise inaccessible land. An auto tour route parallels this historic corridor on paved highways through Arizona and California (NPS 2012). In the LUPA Decision Area, points along this trail feature vistas and panoramic views of the Imperial Valley and Anza-Borrego desert lands. In parts of the California desert, this landscape has changed little since the expedition over 200 years ago. The landscape's visual integrity gives visitors a unique opportunity to vicariously experience the visual setting and varying terrain of that historic trip. Segments of recreation trail exist through the Imperial Borrego Valley ecoregion subarea near or within the historic trail corridor. There are four Anza Expedition campsites, including well-known campsites San Sebastian Marsh and Yuha Wells.

Approximately 367 miles of the Old Spanish National Historic Trail are within the LUPA Decision Area (Figure III.20-6 and Table III.20-3). The trail is over 2,700 miles long and crosses New Mexico, Colorado, Arizona, Utah, Nevada, and California. The NPS is developing the Old Spanish Trail Comprehensive Management Plan, which will provide guidance for identifying trail routes, protecting trail resources, and enhancing the visitor's experience along the trail. The trail is a combination of indigenous tribal paths and the horse and mule exploration and trade routes of the early 1800s (NPS 2012b). The Old Spanish National Historic Trail is not a continuous trail alignment, and there are very few

officially designated hiking trails along the trail corridor. Although portions of the trail are on privately owned land, there are numerous locations that have public access, viewpoints, and interpretive sites for visitors. Portions of SR-78 from approximately Westmoreland to the junction of SR-78 and S-3 are designated as the Juan Bautista de Anza National Historic Trail Auto Route.

III.20.2.6 Existing Built Environment and Renewable Energy Projects

The LUPA Decision Area covers more than 35,000 square miles (22,400,000 acres) and includes parts of seven counties, many incorporated cities and towns, and six military installations. Various types of structures, agricultural lands, and transportation and utility infrastructure make up the built environment of the LUPA Decision Area's visual landscape.

As of October 2013, 53 solar, wind, and geothermal energy projects on 89,000 acres within the LUPA Decision Area were either operating or under construction. These projects have a combined generating capacity of 6,250 megawatts (MW) and have introduced new elements into the visual landscape including altered land surfaces, roads, electric converters and substations, piping, transmission line corridors and support structures, solar arrays, towers, turbines, and power plants. These elements contribute to the existing affected environment of future projects. Figure III.1-2a and Figure III.1-2b show the locations of existing projects, and Table III.1-1 summarizes their respective generating capacities. Additional information is provided in Table 2 of Appendix O.

Renewable energy projects are located primarily in Kern, Los Angeles, Riverside, San Bernardino, and Imperial counties. Thirty of the 53 existing renewable energy projects in the LUPA Decision Area are either operational or under construction in the West Mojave and Eastern Slopes ecoregion subarea. Four of the ten ecoregion subareas have no existing projects.

III.20.3 Summary of Visual Resources and Visually Important Management Units

This section summarizes the acres or physical dimensions of the visual resources described above for each ecoregion subarea and for the CDCA Area outside the DRECP boundary. While BLM lands have VRIs, not all have assigned VRM classifications. Tables III.20-4 through III.20-14 show the factors related to visual resources in terms of number of acres or miles, by resource type, and ecoregion subarea and for the CDCA Area outside the DRECP boundary.

III.20.3.1 Cadiz Valley and Chocolate Mountains Ecoregion Subarea

Table III.20-4
Visual Resources and Visually Important Management Units: Cadiz Valley and Chocolate Mountain Ecoregion Subarea

Category	Resource	Extent
BLM Visual Resource Inventory Classes	Class I Class II Class III Class IV	783,000 acres 447,000 acres 589,000 acres 333,000 acres
BLM Visual Resource Management Classes	Class I	791,000 acres
National Parks and Preserves	Joshua Tree National Park	42,000 acres
National Byways	Bradshaw Trail National Backcountry Byway	56 miles
National Trails	—	—
Wild and Scenic Rivers	—	—

[1] Acres are reported for BLM-managed lands only
Acres shown for VRM include all WSAs and wilderness, which by BLM policy are assigned VRM Class I. VRM classes have not been assigned to other lands within this ecoregion subarea.
Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore ,the subtotals may not sum to the total in the table.

Three renewable energy projects covering approximately 6,000 acres are in the Cadiz Valley and Chocolate Mountains ecoregion subarea, including the 550 MW Desert Sunlight Solar Photovoltaic Farm, which occupies approximately 4,000 acres of BLM land. These highly visible projects are adjacent to or near Interstate (I) 10 and contribute to the existing visual landscape.

III.20.3.2 Imperial and Borrego Valley Ecoregion Subarea

Table III.20-5
Visual Resources and Visually Important Management Units: Imperial and Borrego Valley Ecoregion Subarea

Category	Resource	Extent
BLM Visual Resource Inventory Classes	Class I Class II Class III Class IV	53,000 acres 143,000 acres 395,000 acres 248,000 acres

Table III.20-5
Visual Resources and Visually Important Management Units:
Imperial and Borrego Valley Ecoregion Subarea

Category	Resource	Extent
BLM Visual Resource Management Classes	Class I Class II Class III Class IV	53,000 acres 101,000 acres 68,000 acres 15,000 acres
National Parks & Preserves	—	—
National Byways	—	—
National Trails	Juan Bautista De Anza National Historic Trail†	193 miles
Wild and Scenic Rivers	—	—

1 Acres are reported for BLM-managed lands only
† Includes recreational portions of the Anza Trail as well as the motor route
Acres shown for VRM include all WSAs and wilderness, which by BLM policy are assigned VRM Class I, as well as those lands for which VRM classes have been assigned by the Imperial Sand Dunes RAMP.
Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.

Eleven renewable energy projects occupying approximately 21,000 acres, with a combined generating capacity of approximately 1,261 MW, are in the Imperial Borrego Valley ecoregion subarea. Eight are solar projects, two are geothermal facilities, and one is a wind energy project. The largest project of these is the Ocotillo Express Wind Project, adjacent to I-8, just west of El Centro. These highly visible projects are now part of the area's existing visual landscape.

III.20.3.3 Kingston and Funeral Mountains Ecoregion Subarea

Table III.20-6
Visual Resources and Visually Important Management Units:
Kingston and Funeral Mountains Ecoregion Subarea

Category	Resource	Extent
BLM Visual Resource Inventory Classes	Class I Class II Class III Class IV	618,000 acres 186,000 acres 237,000 acres 146,000 acres
BLM Visual Resource Management Classes	Class I	620,000 acres

Table III.20-6
Visual Resources and Visually Important Management Units:
Kingston and Funeral Mountains Ecoregion Subarea

Category	Resource	Extent
National Parks & Preserves	Death Valley National Park Mojave National Preserve	559,000 acres 583,000 acres
National Byways	Death Valley Scenic Byway/State Route 190	1.8 miles
National Trails	Old Spanish National Historic Trail	84 miles
Wild and Scenic Rivers	Amargosa River	15 miles

[1] Acres are reported for BLM-managed lands only
Acres shown for VRM include all WSAs and wilderness, which by BLM policy are assigned VRM Class I. VRM classes have not been assigned to other lands within this ecoregion subarea.
Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.

One renewable energy project occupying approximately 3,000 acres and generating 390 MW is in the Kingston and Funeral Mountains ecoregion subarea. This is the Ivanpah Solar Electric Generating System Solar Power Tower Project, which consists of three 450-foot-high (approximately) power tower units, each surrounded by ground-mounted heliostat mirrors. The project area is highly visible from I-15 and is in a Conservation Planning Area. It is surrounded by the Ivanpah Valley Area of Critical Environmental Concern and portions of the Mojave National Preserve, including the nearby Clark Mountains and East Mojave National Scenic Area.

III.20.3.4 Mojave and Silurian Valley Ecoregion Subarea

Table III.20-7
Visual Resources and Visually Important Management Units:
Mojave and Silurian Valley Ecoregion Subarea

Category	Resource	Extent
BLM Visual Resource Inventory Classes	Class I Class II Class III Class IV	427,000 acres 139,000 acres 177,000 acres 254,000 acres
BLM Visual Resource Management Classes	Class I	428,000 acres
National Parks & Preserves	Death Valley National Park Mojave National Preserve	11,000 acres 232,000 acres
National Byways	—	—

Table III.20-7
Visual Resources and Visually Important Management Units: Mojave and Silurian Valley Ecoregion Subarea

Category	Resource	Extent
National Trails	Old Spanish National Historic Trail	171 miles
Wild and Scenic Rivers	Amargosa River	8 miles
	Mojave River	9 miles

1 Acres are reported for BLM-managed lands only

Acres shown for VRM include all WSAs and wilderness, which by BLM policy are assigned VRM Class I. VRM classes have not been assigned to other lands within this ecoregion subarea.

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.

III.20.3.5 Owens River Valley Ecoregion Subarea

Table III.20-8
Visual Resources and Visually Important Management Units: Owens River Valley Ecoregion Subarea

Category	Resource	Extent
BLM Visual Resource Inventory Classes	Class I	29,000 acres
	Class II	116,000 acres
	Class III	40,000 acres
	Class IV	1,000 acres
BLM Visual Resource Management Classes	Class I	29,000 acres
	Class II	27,000 acres
	Class III	59,000 acres
	Class IV	7,000 acres
National Parks and Preserves	—	—
National Byways	—	—
National Trails	—	—
National Historic Site	Manzanar National Historic Site	800 acres
Wild and Scenic Rivers	—	—

1 Acres are reported for BLM-managed lands only

Acres shown for VRM include all WSAs and wilderness, which by BLM policy are assigned VRM Class I; as well as those lands for which VRM classes have been assigned by the Bishop RMP. VRM classes have not been assigned to other lands within this ecoregion subarea.

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the

subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.

One renewable energy project occupying approximately 100 acres and generating 1,378 MW is in the Owens River Valley ecoregion subarea, at Naval Air Weapons Station China Lake. It is part of the visual landscape associated with the Naval facility and agricultural and residential development in the area.

III.20.3.6 Panamint Death Valley Ecoregion Subarea

Table III.20-9
Visual Resources and Visually Important Management Units:
Panamint Death Valley Ecoregion Subarea

Category	Resource	Extent
BLM Visual Resource Inventory Classes	Class I Class II Class III Class IV	60,000 acres 85,000 acres 228,000 acres 79,000 acres
BLM Visual Resource Management Classes	Class I	60,000 acres
National Parks & Preserves	Death Valley	1,188,000 acres
National Byways	Death Valley Scenic Byway/State Route 190	59 miles
National Trails	—	—
Wild and Scenic Rivers	—	—

1 Acres are reported for BLM-managed lands only
Acres shown for VRM include all WSAs and wilderness, which by BLM policy are assigned VRM Class I. VRM classes have not been assigned to other lands within this ecoregion subarea.
Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.

III.20.3.7 Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

Table III.20-10
Visual Resources and Visually Important Management Units:
Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

Category	Resource	Extent
BLM Visual Resource Inventory Classes	Class I Class II Class III Class IV	162,000 acres 60,000 acres 165,000 acres 334,000 acres

Table III.20-10
Visual Resources and Visually Important Management Units:
Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

Category	Resource	Extent
BLM Visual Resource Management Classes	Class I	165,000 acres
National Parks & Preserves	Joshua Tree National Park Mojave National Preserve	540,000 acres 500 acres
National Byways	—	—
National Trails	Pacific Crest National Scenic Trail Old Spanish National Historic Trail	11 miles 2 miles
Wild and Scenic Rivers	—	—

1 Acres are reported for BLM-managed lands only
Acres shown for VRM include all WSAs and wilderness, which by BLM policy are assigned VRM Class I. VRM classes have not been assigned to other lands within this ecoregion subarea.
Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.

Seven relatively small renewable energy projects occupying approximately 400 acres and generating approximately 45.6 MW are in the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea. Four of these projects are north of Joshua Tree National Park, in relative proximity to each other. The three other projects are southwest of Barstow, near I-15.

III.20.3.8 Piute Valley and Sacramento Mountains Ecoregion Subarea

Table III.20-11
Visual Resources and Visually Important Management Units:
Piute Valley and Sacramento Mountains Ecoregion Subarea

Category	Resource	Extent
BLM Visual Resource Inventory Classes	Class I Class II Class III Class IV	399,000 acres 360,000 acres 140,000 acres 2,000 acres
BLM Visual Resource Management Classes	Class I	407,000 acres
National Parks & Preserves	Mojave National Preserve	15,000 acres
National Byways	—	—
National Trails	Old Spanish National Historic Trail	14 miles
Wild and Scenic Rivers	—	—

1 Acres are reported for BLM-managed lands only

Acres shown for VRM include all WSAs and wilderness, which by BLM policy are assigned VRM Class I. VRM classes have not been assigned to other lands within this ecoregion subarea.
Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.

III.20.3.9 Providence and Bullion Mountains Ecoregion Subarea

Table III.20-12
Visual Resources and Visually Important Management Units: Providence and Bullion Mountains Ecoregion Subarea

Category	Resource	Extent
BLM Visual Resource Inventory Classes	Class I	601,000 acres
	Class II	230,000 acres
	Class III	468,000 acres
	Class IV	104,000 acres
BLM Visual Resource Management Classes	Class I	604,000 acres
National Parks & Preserves	Joshua National Park	22,000 acres
	Mojave National Preserve	649,000 acres
National Byways	—	—
National Trails	Old Spanish National Historic Trail	28 miles
Wild and Scenic Rivers	—	—

1 Acres are reported for BLM-managed lands only

Acres shown for VRM include all WSAs and wilderness, which by BLM policy are assigned VRM Class I. VRM classes have not been assigned to other lands within this ecoregion subarea.
Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.

III.20.3.10 West Mojave and Eastern Slopes Ecoregion Subarea

Table III.20-13
Visual Resources and Visually Important Management Units: West Mojave and Eastern Slopes Ecoregion Subarea

Category	Resource	Extent
BLM Visual Resource Inventory Classes	Class I	84,000 acres
	Class II	139,000 acres
	Class III	199,000 acres
	Class IV	428,000 acres

Table III.20-13
Visual Resources and Visually Important Management Units:
West Mojave and Eastern Slopes Ecoregion Subarea

Category	Resource	Extent
BLM Visual Resource Management Classes	Class I Class III	87,000 acres 20,000 acres
National Parks & Preserves	—	—
National Preserves	—	—
National Trails	Pacific Crest National Scenic Trail Old Spanish National Historic Trail	103 miles 68 miles
Wild and Scenic Rivers	—	—

1 Acres are reported for BLM-managed lands only

Acres shown for VRM include all WSAs and wilderness, which by BLM policy are assigned VRM Class I; as well as those lands for which VRM classes have been assigned by the Bakersfield RMP. VRM classes have not been assigned to other lands within this ecoregion subarea.

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.

Thirty renewable energy projects, occupying approximately 57,000 acres with a generating capacity of approximately 6,250 MW, are in the West Mojave and Eastern Slopes ecoregion subarea. Included is a mix of wind and solar projects, the larger of which are wind farms. One of these renewable energy projects is a solar energy project on the Edwards Air Force Base. The development of these projects with their supporting infrastructure has introduced noticeable visual changes that are now part of the existing visual landscape of the region.

III.20.3.11 CDCA Area Outside the DRECP Boundary

The LUPA Decision Area includes lands outside the CDCA boundary, where no ecoregion subareas have been defined. The visual resources elements in these areas are shown in Table III.20-15, including lands that BLM has classified as VRI classes I-IV, segments of national byways and national trails.

Table III.20-14
Visual Resources and Visually Important Management Units: CDCA Area outside the DRECP Boundary

Category	Resource	Extent
BLM Visual Resource Inventory Classes	Class I Class II Class III Class IV	625,000 acres 272,000 acres 127,000 acres 35,000 acres
BLM Visual Resource Management Classes	Class I	632,000 acres
National Byways	Bradshaw Trail National Backcountry Byway SR-190 Death Valley National Park Scenic Route	8 miles Trace
National Trails	Juan Bautista De Anza National Historic Trail† Old Spanish National Historic Trail Pacific Crest National Scenic Trail	37 miles Trace 68 miles
Wild and Scenic Rivers	Surprise Canyon Creek	4 miles

1 Acres are reported for BLM-managed lands only
† Includes Recreational portions of the Anza Trail as well as the motor route
Acres shown for VRM include all wilderness study areas and wilderness, which by BLM policy are assigned VRM Class I. (None of the lands assigned VRM Classes by the Bakersfield or Bishop RMPs, or the ISDRA RAMP occur outside the DRECP Boundary.).
Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.

III.20.4 Transmission Outside the DRECP Area

Although it is feasible to characterize existing visual conditions in identified transmission corridors, project-level analyses are required to determine the actual impacts of specific future projects on visual resources. The methodology used for project-level analyses varies depending on the agency with jurisdiction over the land considered. Analyses of visual impacts on BLM lands use BLM's VRM system to identify visual contrast (described in detail in Section III.20.1.2), which is then analyzed through the National Environmental Policy Act process. For facilities on lands administered by the Angeles, San Bernardino, and Cleveland national forests, the analytical approach is described in the USFS's Scenery Management System.

III.20.4.1 Transmission Lines

New transmission lines connecting renewable energy facilities in the DRECP area to load centers would potentially be adjacent to or near existing transmission lines and/or within existing corridors. New transmission lines would introduce strong vertical elements (towers) into the landscape. Locating new lines close to other towers would increase the vertical

elements in a viewshed. Visible but less prominent horizontal elements (conductors) would be visible between towers. In addition, depending on aviation safety requirements, FAA may require the installation of safety lights on some towers and marker balls on some conductor spans between towers.

Outside the DRECP area, transmission lines leading south and west to load centers in the Los Angeles and San Diego regions would traverse two distinct landscapes: mountain and valley terrain and developed land. Southern California's populated coastal and valley areas are separated from the inland Mojave Desert by mountains. Most lines would traverse these mountains. Although there are pockets of development, these mountainous areas are sparsely inhabited and primarily on public land. Outside of the desert, extensive suburban and dense urban development occupies much of the land between the mountains and the coast and within the valleys between mountain ranges. There often is a sharp line of demarcation between the two landscape conditions because of ownership and constructability, with the mountains rising sharply from built-up flat coastal and valley terrain.

After passing through the Tehachapi Mountains, a transmission line heading north out of the DRECP area to the San Francisco Bay Area would be sited in the I-5 corridor and parallel existing transmission lines. Except for the mountains separating the DRECP area from the Central Valley, the landscape along this alignment is agricultural in either orchards or cropland on the valley floor or in foothill grassland.

III.20.4.1.1 San Diego Area

New transmission lines from the DRECP area to load centers in the San Diego area would potentially be in or near the existing Sunrise Powerlink 500/230 kV transmission line corridor, which extends from Imperial County to substations near Alpine (Suncrest Substation) and Poway (Sycamore Substation). The transmission line corridor roughly parallels and runs alternately north and south of I-8, and is most visible at locations where it crosses or is near the highway.

From Ocotillo in Imperial County to Alpine in San Diego County, the alignment is largely in desert terrain characterized by flat valley floors, outwash plains, and rugged mountains. The landscape can be described as a remote/rural environment. Much of this area is public land administered by either BLM or the USFS (Cleveland National Forest). The visual landscape is characterized by mountains, inter-mountain valleys, sparse low-lying vegetation, and relatively few public roads. The alignment crosses the Pacific Crest National Scenic Trail near Campo and Buckman Springs. Some small communities and pockets of rural development lie along the desert portion of the alignment, but overall population

density is very low. There is agricultural activity in some valley locations. Transmission lines, pads, and access roads in this landscape could potentially be visible over many miles.

Starting at Alpine and continuing west, the alignment traverses a mixed rural and suburban landscape that extends through Lakeside to Poway. Much of the alignment is situated on ridges and slopes above local roads and developed areas. Although not as sparse as in the eastern portion of the alignment, natural vegetation is primarily low lying. Suburbanization has resulted in taller planted vegetation around properties and along some roads, but this planted vegetation is not found in the alignment itself. The visibility of transmission lines in this landscape varies greatly, depending on the location of the viewer and the proximity of trees, buildings, or landforms that could block sightlines.

The Sunrise Powerlink corridor does not pass through any highly urbanized landscapes with closely built, multistory buildings.

III.20.4.1.2 Los Angeles Area

Power from the DRECP area into load centers in the Los Angeles area would be delivered via the Vincent Substation south of the City of Palmdale, in northern Los Angeles County. From the Vincent Substation, transmission lines would follow two different paths. One 500 kV line along the existing Tehachapi Renewable Transmission Project (TRTP) Segment 11 corridor would deliver power to the Mesa Substation in Monterey Park and the Lighthipe Substation near Paramount. A second 500 kV line would be in the existing TRTP segments 6 and 7 corridor, east of the TRTP Segment 11 corridor, which would deliver power from Vincent Substation to Mesa Substation.

From the Vincent Substation near Highway 14 to just north of I-210, both the TRTP Segment 11 and segments 6 and 7 corridors traverse the rugged mountain terrain of the Angeles National Forest. Both corridors cross the Pacific Crest National Scenic Trail. As it leaves the Angeles National Forest, TRTP Segment 11 skirts Altadena on the north; the segments 6 and 7 corridors leave USFS lands just east of Bradbury. Within the Angeles National Forest, both routes are characterized by steep mountainous terrain and low-lying vegetation.

Upon leaving the ANF, the transmission line alignments immediately enter and cross the dense suburban landscape of the I-210 and I-10 corridors. There is little transition between the undeveloped forestland and the highly developed suburban and urban landscapes. The visual character in this built environment is dominated by single-family residential properties and local streets. The two TRTP alignments meet at Mesa Substation. South from Mesa Substation to Lighthipe Substation, the transmission corridor traverses dense suburban development characterized by a mix of single-family and multifamily residential,

commercial, and light industrial development. The corridor right-of-way itself supports open space and agricultural uses.

In addition to transmission lines out of Vincent Substation, an upgraded 320 kV direct current line between Substation 7 south of Hesperia and substations B and 8 near the city of South Gate would traverse landscapes similar to those described for the TRTP Segment 11 and segments 6 and 7 corridors.

As with the two other 500 kV transmission corridors from Vincent Substation, a new 500 kV transmission line from Vincent Substation to an upgraded Los Angeles Department of Water and Power Station E Substation in North Hollywood would traverse mountainous USFS lands of the Angeles National Forest before emerging into urbanized greater Los Angeles just north of I-210 at Lake View Terrace. The existing right-of-way through the urban area supports open space and agricultural uses and passes through residential, commercial, and light-industrial areas.

III.20.4.1.3 North Palm Springs–Riverside Area

Renewable energy from the DRECP area would also flow to load centers through transmission lines along the I-10 corridor. Multiple 500 kV lines would be sited in existing transmission corridors. Depending on need, varying numbers of circuits would be required in individual inter-substation segments of the corridor. The primary corridor would be between the Colorado River Substation in the DRECP area and the Devers, Rancho Vista, and Lugo substations to the west, outside the DRECP area. Other corridors in the North Palm Springs–Riverside Area would be between the new Imperial Irrigation District Midway X Substation in the DRECP area and the Devers Substation, between the Devers and Valley substations, and between the Rancho Vista and Serrano substations.

The Colorado River Substation to Lugo corridor passes through both undeveloped and developed landscapes. The portion of the corridor outside the DRECP area along I-10 begins near Desert Center. From there to Devers Substation is desert, characterized by flat outwash plains and rugged mountains. The corridor is primarily in Chuckwalla Valley and Shavers Valley, between the Eagle Mountains to the north and the Orocopia and Chuckwalla mountains to the south. Vegetation is sparse and surface disturbance and physical elements introduced into the landscape are potentially visible over considerable distances, except in locations where they are screened from view by mountains. Existing transmission lines and gas pipelines parallel the highway. Transmission lines would be visible to visitors in some areas of Joshua Tree National Park, north of I-10; to residents in isolated desert communities; to interstate highway travelers; and to visitors to recreation areas and Areas of Critical Environmental Concern on BLM lands. Joshua Tree National

Park is internationally noted for its dark night skies, making night aviation safety lighting on structures (transmission towers, power towers, wind turbines) a potential concern.

Continuing west, the transmission line corridor enters the Coachella Valley near Indio. The landscape remains sparsely vegetated desert, but with some areas of extensive development. The corridor in and out of Devers Substation is north of I-10, while most residential and commercial development in Palm Springs and other communities is south of I-10. The corridor in this area also passes through extensive wind farm developments on BLM and private lands. Farther west, the corridor passes through the San Gorgonio Pass and north of developed areas in Cabazon, Banning, and Beaumont. The character of these communities is suburban residential and commercial, intermixed with pastureland. Development becomes increasingly frequent and dense as the corridor moves west.

The corridor crosses the Badlands, a mountainous area south of I-10 and north of Moreno Valley. This area roughly parallels San Timoteo Canyon Road for part of its length and is characterized by increasingly dense shrub vegetation and hilly terrain. Emerging from the Badlands south of Loma Linda, the corridor continues west through a mixture of residential, commercial, and light industrial uses in communities south of I-10. The corridor turns north through an industrial area of Rancho Cucamonga and parallels I-15 before leaving the developed valley floor and skirting the east end of the San Gabriel Mountains. Continuing north and northeast, the corridor passes through mountainous areas with dense shrub vegetation. The corridor crosses the Pacific Crest National Scenic Trail near Highway 138 and continues on to Lugo Substation near Hesperia.

The outside the DRECP area corridor for transmission from the new Imperial Irrigation District Midway X Substation runs from the Imperial County line to Devers Substation and traverses sparsely vegetated desert. This corridor is east of the Salton Sea and continues northwest to the east of the Coachella Canal before crossing the I-10 corridor east of Indio. After crossing I-10, the corridor continues west into Devers Substation.

The corridor to Valley Substation emerges from Devers Substation and crosses to the south side of I-10, passing through small residential areas near Cabazon and Banning, and traverses the lower elevations of the San Jacinto Mountains before descending into irrigated agricultural land between Gillman Springs Road and Ramona Expressway. From there the corridor ascends into the hilly terrain of Lake View Mountains then descends to open land and an area of mixed residential and commercial uses before reaching Valley Substation in Romoland.

The corridor extending from Rancho Vista Substation to Serrano Substation would pass through industrial development east of I-15 before crossing into a mixed suburban/ agricultural area south of Highway 60. The route would pass along the north side of the

suburban community of Eastvale, continuing east through a mix of residential, commercial, and agricultural areas before reaching the Chino Hills near Highway 71. These rolling hills are characterized by grassland and shrub vegetation. The corridor emerges from the hills in Yorba Linda and continues south across Yorba Linda Boulevard and Highway 91. This area has extensive dense suburban residential and commercial development. The corridor continues across the Anaheim Hills Golf Course and the Anaheim Hills community before arriving at the Serrano Substation on Cannon Street.

III.20.4.1.4 Central Valley

The transmission corridor from Whirlwind Substation in the DRECP area crosses over the Tehachapi Mountains to the San Joaquin Valley south of Arvin, then continues north along the I-5 corridor, connecting the Midway, Gates, and Los Banos substations before ending at the Tesla Substation near Tracy.

Heading northwest from Whirlwind Substation near Rosamond, the corridor crosses the Pacific Crest National Scenic Trail and enters the Tehachapi Mountains, crossing the crest south of Cummings Mountain at about 5,000 feet elevation. The eastern slopes of the mountains are characterized by sparse shrub vegetation and semi-desert conditions. The elevations above about 2,500 feet support grassland and oak woodland vegetation. Descending into the San Joaquin Valley, the mountains and foothills are primarily grassland. The mountains are very sparsely populated, and there are no roads or residences in the corridor through the mountains.

The northern edge of the Tehachapi Mountains transitions immediately to irrigated agricultural land with scattered farms and a grid road pattern. The corridor continues through this flat agricultural land, crossing Highway 99 and turning north to parallel I-5. West of Rosedale, the corridor doglegs west across I-5, then heads north again at Buttonwillow, at Midway Substation. From the substation, the corridor continues north, again crossing to the east side of I-5 and continuing through croplands and orchards. In the general vicinity of Lost Hills, the corridor crosses pastureland, fallow land, and uncultivated land. The corridor continues through irrigated cropland and orchards near Kettleman City. The corridor alignment then crosses to the west of I-5 and continues north in the rolling grassland foothills of the coast ranges, including the Big Blue Hills and Panoche Hills. From Kettleman City north to the end of the corridor, I-5 essentially marks the boundary between agricultural land to the east and foothills to the west. Near Patterson, the corridor moves northwest from I-5 to follow I-580 to the Tesla Substation west of Tracy, in the Altamont Pass.

III.20.4.2 Substations

New transmission lines carrying power from the DRECP area would likely tie into existing substations. These would need to be upgraded or enlarged in order to handle the increased electric loads.

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III.21 NOISE AND VIBRATION

This chapter describes the affected environment for noise and noise-related laws and regulations that govern renewable energy development and operation within the Desert Renewable Energy Conservation Plan (DRECP) area. Most jurisdictions have developed noise standards and thresholds to control and mitigate noise impacts on human populations; however, none of the following agencies has adopted specific thresholds to determine noise impacts to terrestrial noise-sensitive species. See Chapter III.7, Biological Resources, for a discussion of the regulations that govern sensitive species within the DRECP area.

Appendix R1.21 provides supporting information for this chapter including maps of the communities and cities within the DRECP area.

III.21.1 Regulatory Setting

III.21.1.1 Federal

III.21.1.1.1 Noise Control Act

The Noise Control Act of 1972 and its subsequent amendments in the Quiet Communities Act of 1978 (42 United States Code [U.S.C.] 4901 et seq.) delegate authority to the states to regulate environmental noise and directs government agencies to ensure compliance with local community noise statutes and regulations.

III.21.1.1.2 Federal Aviation Administration Standards

The Federal Aviation Administration establishes 65 decibel (dB) community noise equivalent level (CNEL) as the noise standard for aircraft noise (Federal Aviation Administration Regulation Part 150, Section 150.21).

III.21.1.1.3 Federal Highway Administration Standards

Federal Highway Administration (FHWA) standards preempt county standards for federally funded road construction projects (23 Code of Federal Regulations [CFR] 772.19). The FHWA establishes specific noise standards for different land use categories in federal highway projects.

III.21.1.1.4 Federal Railroad Administration Standards

Impact assessment methods outlined in Federal Railroad Administration standards recommend consideration of adjacent land use categories, existing ambient conditions, and

future exposure levels. For a federally funded rail project, the Federal Railroad Administration standards preempt county standards.

III.21.1.1.5 Federal Transit Administration Standards

The Federal Transit Administration provides comprehensive guidance and detailed impact criteria. For federally funded mass transit projects, the Federal Transit Administration standards preempt county standards.

III.21.1.2 State

III.21.1.2.1 California Noise Control Act

The California Legislature has determined that excessive noise is a serious hazard to the public health and welfare and that exposure to high levels of noise can cause physiological, psychological, and economic damage. It has further determined that there is continuous and increasing bombardment of noise in urban, suburban, and rural areas (California Health and Safety Code, Section 46000 et seq.). The California Noise Control Act states that the State of California bears the responsibility to protect the health and welfare of its residents through the control, prevention, and abatement of noise. State policy is to provide an environment free of noise that could jeopardize their health and welfare.

III.21.1.3 Local

The DRECP and all its alternatives cover areas located within Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego counties. The county boundaries in relation to the DRECP area are shown in Volume I, Figure I.0-1.

III.21.1.3.1 Imperial County

The Noise Element in the Imperial County General Plan (1996) provides information to determine land use policies that protect noise-sensitive land uses and develop and enforce a local noise ordinance. The Noise Element of the Imperial County General Plan includes a program to incorporate noise issues into the land use planning process, with the goals of protecting the public from noise intrusion and discouraging development of noise generating activities near noise-sensitive land uses.

III.21.1.3.1.1 Noise Standards for Geothermal/Alternative Energy and Transmission

Although there are no specific noise standards in the Geothermal/Alternative Energy and Transmission Element (2006) of the Imperial County General Plan, the plan states that

general and specific land use standards will be followed to minimize adverse noise impacts to sensitive receptors. For a definition of sensitive receptors, see Section III.21.3.1.

III.21.1.3.2 Inyo County

The goal of the Noise Element of the Inyo County General Plan (1982) is to restrict the exposure of sensitive receptors to excessive levels of ambient noise through policies and regulations. The county boundaries in relation to the DRECP area are shown in Figure I.0-1.

III.21.1.3.2.1 Noise Standards for Wind Energy Conversion Systems

Inyo County has various standards that cover small wind energy conversion systems (WECS) that are modified, expanded, installed, operated, or constructed in the unincorporated part of Inyo County.

Inyo County Code (Section 18.79.100[E][2]) states, "Any noise resulting from the system shall not exceed 60 dBA (A-weighted dB) at, but outside of, the closest neighboring inhabited dwelling. Noise limits may exceed these limits during temporary, short-term events such as wind storms and utility outages." See Section III.21.2.1 for an explanation of noise measurement fundamentals.

III.21.1.3.2.2 Noise Standards for Geothermal Resource Development

Inyo County Code Section 19.24.030 states:

> Each operator shall limit the continuous generation of wide band noise to that required. The level may be exceeded by 10% for any one occurrence if the noise is intermittent and during daylight hours. The noise levels shall be measured at the parcel boundary.
>
> Sound pressure levels shall be measured at the parcel boundary and shall be measured with a sound level meter and associated octave band analyzer conforming to standards prescribed by the United States of America Standards Institute.

III.21.1.3.3 Kern County

The Kern County General Plan (2009) Noise Element set a goal to protect Kern County residents from excessive noise and to ensure that moderate levels of noise are not exceeded. This goal is achieved through policies and regulations.

III.21.1.3.3.1 Wind Energy Combining District

Kern County promotes the use of wind-driven generators for energy recovery and uses alternatives to fossil-fuel-generated electrical power in suitable areas of the county. Kern County also promotes safeguards to ensure the health, safety, and welfare of its residents. The county has specific policies that govern noise from wind energy projects.

The Kern County Municipal Code, Section 19.64.140(J) states:

> Where a residence, school, church, public library or other sensitive or highly sensitive land use, as identified in the noise element of the county General Plan, is located within one mile in a prevailing downwind direction or within one-half mile in any other direction of a project's exterior boundary, an acoustical analysis shall be prepared by a qualified acoustical consultant prior to the issuance of any building permit. The consultant and the resulting report shall be subject to review and approval by the Kern county health department. The report shall address any potential impacts on sensitive or highly sensitive land uses.
>
> In addition, the acoustical report shall demonstrate that the proposed development shall comply with the following criteria:
>
> 1. Audible noise due to wind turbine operations shall not be created which causes the exterior noise level to exceed 45 dBA for more than five minutes out of any one hour time period (also referred to as L8.3[1]) or to exceed 50 dBA for any period of time when measured within 50 feet of any existing residence, school, hospital, church, or public library.
> 2. Low-frequency noise or infrasound from wind turbine operations shall not be created which causes the exterior noise level to exceed the following limits when measured within 50 feet of any existing residence, school, hospital, church or public library:

One-Third Octave Band Center Frequency (Hertz)	Sound Pressure Level (dB)
2 to 1	70 (each band)
20	68
25	67
31.5	65

[1] L8.3 is the noise level equaled or exceeded 8.3% of the specified time period (e.g., 5 minutes per hour): it is generally similar in level to the Leq.

One-Third Octave Band Center Frequency (Hertz)	Sound Pressure Level (dB)
40	62
50	60
63	57
80	55
100	52
125	50

3. In the event audible noise due to wind turbine operations contains a steady pure tone, such as a whine, screech or hum, the standards for audible noise set forth in subparagraph (1) of this subsection shall be reduced by five dBA. A pure tone is defined to exist if the one-third octave band sound pressure level in the band, including the tone, exceeds the arithmetic average of the sound pressure levels of the two contiguous one-third octave bands by five dBA for center frequencies of 500 [hertz (Hz)] and above, by eight dBA for center frequencies between 160 Hz and 400 Hz, or by 15 dBA for center frequencies less than or equal to 125 Hz.
4. In the event the audible noise due to wind turbine operations contains repetitive impulsive sounds, the standards for audible noise set forth in subparagraph (1) of this subsection shall be reduced by five dBA.
5. In the event the audible noise due to wind turbine operations contains both a pure tone and repetitive impulsive sounds, the standards for audible noise set forth in subparagraph (1) of this subsection shall be reduced by a total of five dBA.
6. In the event the ambient noise level (exclusive of the development in question) exceeds one of the standards given above, the applicable standard shall be adjusted so as to equal the ambient noise level. For audible noise, the ambient noise level shall be expressed in terms of the highest whole number sound pressure level in dBA which is exceeded for no more than five minutes per hour (L8.3). For low-frequency noise or infrasound, the ambient noise level shall be expressed in terms of the equivalent level (L_{eq}) for the one-third octave band in question, rounded to the nearest whole decibel. Ambient noise levels shall be measured within 50 feet of potentially affected existing residences, schools, hospitals, churches or public libraries. Ambient noise level measurement techniques shall employ all practical means of reducing the effects of wind-generated noise at the microphone. Ambient noise level measurements may be performed when wind velocities at the

proposed project site are sufficient to allow wind turbine operation, provided that the wind velocity does not exceed 30 mph at the ambient noise measurement location.

7. Any noise level falling between two whole decibels shall be the lower of the two.
8. In the event that noise levels, resulting from a proposed development, exceed the criteria listed above, a waiver to said levels may be granted by the planning director provided that the following has been accomplished:
   a. Written consent from the affected property owners has been obtained stating that they are aware of the proposed development and the noise limitations imposed by this code, and that consent is granted to allow noise levels to exceed the maximum limits allowed;
   b. A permanent noise impact easement has been recorded in the County Hall of Records which describes the benefited and burdened properties and which advises all subsequent owners of the burdened property that noise levels in excess of those permitted by this code may exist on or at the burdened property.

III.21.1.3.4 Los Angeles County

The Los Angeles County General Plan Noise Element (1974) states that county policy establishes acceptable noise standards that are consistent with health and quality-of-life goals. County policy also employs effective techniques of noise abatement through such means as building codes, noise, sub-divisions, and zoning ordinances. Los Angeles County has therefore established various noise standards within its municipal code.

III.21.1.3.5 Mono County

The goal of the Noise Element of the Mono County General Plan (2010) is to maintain existing ambient noise levels that preserve the county's quiet, rural atmosphere. This is achieved through policies in both the General Plan Noise Element and the county code (Chapter 10.16 [1983]). This code provides property line noise-level limits, interior noise limits, and exclusions and provisions for various noise sources. The ordinance does not contain any specific regulation for renewable energy projects such as wind farms.

III.21.1.3.6 Riverside County

The Riverside County General Plan Noise Element (2008) includes policies and standards to protect public health and welfare from noise impacts.

III.21.1.3.6.1 Wind Energy Conversion Systems

Wind energy conversion systems (WECS), or wind turbines, harness the energy from strong gusts of wind. Many wind turbines now operate in portions of the Coachella Valley and San Gorgonio Pass, within Riverside County. To avoid noise and ground-borne vibration in neighboring developed areas, the Wind Implementation Monitoring Program, designed and implemented by Riverside County, is enforced.

In addition, the Riverside County Municipal Code, Section 17.224 states:

a. A commercial WECS permit shall not be granted unless the applicant demonstrates that the proposed WECS or WECS array complies with the setbacks requiring no acoustical studies as set forth in subsection (L)(1)(b) of this section, or that the projected WECS noise level will comply with the noise standards as set forth in subsection L (1)(c) of this section. The projected WECS noise level is the level of noise projected to be produced by all commercial WECS proposed under the permit application and shall be calculated in accordance with the technical specifications and criteria adopted pursuant to subsection (L) (3) of this section. A variance from this property development standard may be granted pursuant to the provisions of Chapter 17.196 WECS array setbacks requiring no acoustical studies. WECS arrays with 10 or fewer WECS (comprised of WECS designed in accordance with proven good engineering practices) set back where each WECS in the array [is] 2,000 feet or more from the nearest receptor as set forth in subsection (L)(1)(e) of this section, shall be permitted without an acoustical study.

b. WECS arrays with more than 10 WECS (comprised of WECS designed in accordance with proven good engineering practices) can qualify for this condition if each WECS in the array is set back 3,000 feet or greater. WECS designed with the following characteristics shall be deemed in accordance with proven good engineering practices: at least three blades; upwind rotor; no furling; tapered and twisted blades; airfoils designed to stall softly (defined in technical specifications and criteria adopted pursuant to subsection (L)(3) of this section. WECS arrays approved under this subsection shall have noise standards as set forth in subsection (L)(1)(c) of this section.

c. Noise Standards. The projected WECS noise level to each receptor (as set forth in subsection L (1)(e) of this section) shall be at or below 55 dB(A) weighted (unless at setback distances as set forth in subsection (L)(1)(b) of this section, are adhered to).

d. The noise standard set forth in subsection (L)(1)(c) of this section, shall be reduced by five dB(A) where it is projected that pure tone noise will be generated. A pure tone shall exist if the one-third octave band sound pressure level in the bandwidth of the tone exceeds the arithmetic average of the sound pressure levels on the two contiguous one-third octave bands by five dB for center frequencies of 500 Hz and above, and eight dB for center frequencies between 160 and 400 Hz, and by 15 dB for center frequencies less than or equal to 125 Hz.

   i. Receptor (the point of measurement) for the calculation of the WECS noise level projected pursuant to subsection (L)(1)(a) of this section shall be determined as follows:

   ii. Existing structures in the vicinity of the commercial WECS project property which are actually used as a habitable dwelling, hospital, school, library or nursing home shall be identified.

e. The point of measurement shall be a point 10 feet from the outer wall, or equivalent distance, from the WECS being measured to any habitable dwelling, hospital, school, library or nursing home.

f. Low Frequency Noise Criteria. Where acoustical studies are required, and the WECS are not designed in accordance with proven good engineering practices as defined in subsection (L)(1)(b) of this section, the low frequency noise shall not exceed the following at a receptor: 75 dB(C) weighted (5 to 100 hertz) or Predicted C(PC) for nonimpulsive WECS. 67 dB(C) weighted (5 to 100 hertz) or PC for impulsive WECS (as defined in technical specification and criteria adopted pursuant to subsection (L)(3) of this section). WECS array low frequency impacts shall be calculated in accordance with technical specifications and criteria adopted pursuant to subsection (L)(3) of this section.

III.21.1.3.7 San Bernardino County

The purpose of the Noise Element of the County of San Bernardino General Plan (2007) is to limit the exposure of the community to excessive noise levels. This is achieved through both policies and regulations.

III.21.1.3.8 San Diego County

III.21.1.3.8.1 San Diego County General Plan Noise Element

The purpose of the Noise Element of the San Diego County General Plan (2011) is to limit the exposure of the community to excessive noise levels. It incorporates noise exposure

criteria into land use planning to reduce future conflicts between noise and land use. This is achieved by specifying acceptable noise exposure ranges for various land uses throughout the county. The county uses Noise Compatibility Guidelines to determine the compatibility of noise and land use when evaluating proposed development projects.

The Noise Compatibility Guidelines cover different levels of compatibility and are flexible enough to apply to a range of projects and environments. For example, a commercial project would be evaluated differently from a residential project in a rural area or from a mixed-use project in a more densely developed area of the county.

A land use located in an area identified as "acceptable" would indicate that standard construction methods would attenuate exterior noise to an acceptable indoor noise level, and that people could carry out outdoor activities with minimal noise interference. Land uses that fall into a "conditionally acceptable" noise environment should have an acoustical study that considers the type of noise source, the sensitivity of the noise receptor, and the degree to which the noise source may interfere with sleep, speech, or other activities. For land uses indicated as "conditionally acceptable," structures must be able to attenuate the exterior noise to the indoor noise level, as required in the noise standards. For land uses where exterior noise levels fall within the "unacceptable" range, new construction should generally not be developed.

III.21.1.3.8.2 County of San Diego Noise Ordinance

In addition to the San Diego County General Plan Noise Element (2011), the county adopted community noise control standards in its County Noise Abatement and Control Ordinance (County Code of Regulatory Ordinances, Title 3, Division 6, Chapter 4). These standards provide guidance for implementing the county's noise policies and ordinance in San Diego County's CEQA Guidelines for Determining Significance for Noise. This ordinance defines limits for excessive noise and sets noise-level limits for land uses. San Diego County's California Environmental Quality Act (CEQA) Guidelines provide guidance for the use of the General Plan Noise Element and the County Noise Abatement and Control Ordinance when considering the environmental impacts of noise exposure to high noise levels.

III.21.2 Noise and Vibration Fundamentals

III.21.2.1 Noise Fundamentals

Sound can be defined as air pressure variations that the ear detects. Vibration is the transmission of "sound" waves through solids or liquids.

Sound is caused by minute pressure variations in the air—both above and below static atmospheric pressure—that are sensed by the human ear. The number of these minute

pressure variations, measured over time, is the frequency of the sound. Excessively high noise levels can cause physical and psychological damage.

Sound pressures are measured and reported in units of dB. The dB is a ratio of pressures. Because the dB is logarithmic, sound levels are not cumulative through simple arithmetic. Two equal noise levels will combine logarithmically to increase the noise level by 3 dB.

Noise is defined as any undesirable sound that interferes with normal activities, or that in some way reduces environmental quality. Determining whether a sound is undesirable often depends on a receiver's activity and the time of day. For most people, some usual consequences of noise include interference with speech and other communication, distractions at home and at work, disturbance of rest and sleep, and the disruption of recreational pursuits. The long-term effects of noise can be widespread and include both psychological and physiological effects.

Noise can be of special concern to residents, particularly during evening and nighttime hours. New stationary noise sources, such as wind or thermal turbine generators, can impact nearby communities. Loud noise levels can also potentially impact special-status biological species such as nesting songbirds.

The most common frequency-weighting used for assessment of noise in the ambient environment is A-weighting. A-weighting is a frequency correction that often correlates well with a subjective human response to noise.

The noise at any given location is a function of the noise produced by the source, the propagation path between the source and the receiver, and the sensitivity of the receiver. To reduce noise levels to a sensitive receptor, the only available options are to reduce the noise of the source, interrupt the propagation path between the source and the receiver, or increase the distance between the source and the receiver. The propagation path is simply the path the sound travels between its source and the receiver.

The actual impact of noise is not its loudness alone. The time of day when noise occurs and the duration of the noise are also important factors. Most noise that lasts longer than a few seconds is also variable in its intensity. Therefore, a variety of metrics are used to address sound and noise levels. Sound varies from instant to instant. To describe sound and noise levels, it is necessary to consider the time over which it occurs. The L_{eq} is the equivalent steady-state sound level, in a stated period of time, which contains the same acoustical energy as the time-varying sound level during the same period.

Other measures used in the consideration of noise include the CNEL, the sound exposure level, the maximum noise level (L_{max}), and the level exceeded in a given amount of time (L_N).

While people and other species respond differently to specific noise situations, the overall response is primarily determined by these three elements of evaluation: sound pressure levels, the duration of those levels, and the time of day of the exposure.

The most obvious factor affecting noise levels is the distance from a noise source to a receiver. The manner in which noise weakens over distance depends on:

- Geometric spreading from point and line sources.
- Ground absorption.
- Atmospheric effects and refraction.
- Shielding by natural and man-made features, noise barriers, diffraction, and reflection.

Sound from a small localized source (approximating a "point" source) such as a piece of construction equipment, a wind turbine, or a transformer, radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level decreases or drops off at a rate of 6 dBA for each doubling of the distance (6 dBA/DD).

The repeated movement of multiple sources of the sound appears to emanate from a line (line source) rather than a point when viewed over some time interval. Noise from a line source, such as traffic on a roadway, travels away from the source in a cylindrical pattern, which drops off at a rate of 3 dBA/DD.

The drop-off rates presume that the intervening ground between a source and a receiver is reflective, such as hardscape, parking lots, or smooth bodies of water. If there is an absorptive ground surface such as soft dirt, grass, or scattered bushes and trees, an excess ground attenuation value of 1.5 dBA/DD may be added to the hard site drop-off rate. When added to the hard site drop-off rate, this results in an overall drop-off rate of 4.5 dBA/DD for a line source (7.5 dBA/DD for a point source).

In the outdoor environment, the average person perceives a change in noise level as follows (Bolt, Beranek, and Newman 1973, Beranek 1988):

- 3 dBA: barely perceptible
- 5 dBA: readily perceptible
- 10 dBA: perceived as a doubling or halving of noise

Wind speed can bend the path of sound to "focus" it on the downwind side and create a "shadow" on the upwind side of the source. At short distances, the wind has a minor influence on the measured sound level. For long distances, wind effects become measurably greater. Temperature gradients create effects similar to those of wind gradients, except

that they are uniform in all directions from the source. On a sunny day with no wind, temperature decreases with altitude, creating a shadow effect for sound. On a clear night, temperature may increase with altitude, focusing sound on the ground surface.

A large object in the path between a noise source and a receiver can significantly attenuate noise levels at a given location. The degree of attenuation depends on the size of the object and the frequencies of the sound levels. Natural terrain features such as hills and dense woods, as well as built features such as buildings and walls, can significantly alter perceived noise levels.

Natural sounds are part of the ambient noise environment. In undeveloped and rural areas the sound of wind flowing through vegetation is often dominant. Wind-induced noise includes broadband turbulent noise and Aeolian noise (tones or whistles that vary in frequency with the wind speed). Turbulent noise is characteristic of any natural or artificial structure, and is therefore not considered a nuisance. It is characteristic of trees and some landforms.

Typical noise levels from various sources within the natural and built environments are shown in Table III.21-1. As this table indicates, noise levels could range from fewer than 40 dBA up to 130 dBA (on a short-term basis) near military airfields.

Table III.21-1
Typical Noise Levels in A-Weighted Decibel Scale

Subjective Impression	dBA	Example Noise Condition or Event
Threshold of hearing	0	—
Barely audible	5–10	—
Very quiet	15–30	Empty recording studio; quiet rural area, winter night, no wind; whisper, quiet library
Quiet	35–45	Quiet suburban area at night; typical rural area daytime background conditions
Moderately noisy	50–65	Typical daytime suburban background conditions; typical urban residential area away from major streets; typical daytime urban mixed-use area conditions, background music, conversation in restaurant; typical daytime busy downtown background conditions
Noisy	70–75	Auto, 35 miles per hour at 20 feet; 300 feet from busy 6-lane freeway; street sweeper at 30 feet; idling locomotive at 50 feet
Very noisy	80–85	2-axle commercial truck, 35 miles per hour at 20 feet; city bus at 30 feet
8-hour workplace limit	90	Heavy truck, 35 miles per hour at 20 feet; leaf blower at 5 feet
Extremely noisy	95	Locomotive horn at 100 feet; subway train at 200 feet

Table III.21-1
Typical Noise Levels in A-Weighted Decibel Scale

Subjective Impression	dBA	Example Noise Condition or Event
Possible building damage	100–120	Outboard motor, jackhammer, snowmobile, motorcycle; emergency vehicle siren at 50 feet, power lawn mower at 3 feet; peak crowd noise pro football game, open stadium; F/A-18 aircraft takeoff with afterburner at 1,600 feet, loud rock concert; Mach 1.1 sonic boom under aircraft at 12,000 feet
Threshold of pain	125–130	F/A-18 aircraft takeoff with afterburner at 470 feet, pneumatic riveter at 4 feet; surface detonation, 30 pounds of TNT at 1,000 feet

Source: Data compiled from various sources.

III.21.2.2 Vibration

Construction activities can create varying degrees of ground vibration, depending upon equipment and construction method. Construction activities that typically generate the most severe vibrations are blasting and impact pile driving.

Three ground-borne vibration impacts are of general concern: (1) human annoyance, (2) interference with vibration-sensitive activities, and (3) damage to buildings. In evaluating ground-borne vibration, two descriptors are widely used:

- The peak particle velocity, measured as a distance per time (such as inch/second), is the maximum peak velocity of the vibration and correlates with the stresses experienced by buildings.
- The vibration velocity level represents a one-second average amplitude of the vibration velocity. It is typically expressed on a log scale in decibels (VdB) just as noise is measured in dB. This descriptor is suitable for evaluating human annoyance because the human body responds to average vibration amplitude.

In the United States, there are no widely adopted standards for acceptable levels of the ground vibration generated by construction, although some jurisdictions have adopted vibration standards. A background vibration velocity level in residential areas is typically 50 VdB or lower, well below the threshold of human perception, which is around 65 VdB (Hanson, et al. 2006). Vibration levels would typically be higher in the immediate vicinity of transportation corridors or construction and demolition sites. Human impact is not usually significant unless the vibration exceeds 70 VdB. For evaluating interference with vibration-sensitive activities, the vibration impact criterion for general assessment is 65 VdB.

For residential and institutional land use (primarily daytime use only, such as a school or church), the criteria range from 72 to 80 VdB and from 75 to 83 VdB, respectively,

depending on event frequency. For potentially damaging structural effects, vibration damage guidelines for various structural categories are provided (Hanson, et al. 2006). Damage to buildings would occur at much higher levels (0.12 inch/second or higher, or about 90 VdB or higher) than either human annoyance or interference with vibration-sensitive activities.

III.21.3 Noise and Vibration in the DRECP Area

The existing noise and vibration environments within the DRECP area are as varied as the land uses. See Chapter III.11, Land Use and Policies, for a discussion of existing land uses within the DRECP area.

Due to the generally rural, undeveloped nature of most of the DRECP area, ambient noise levels are expected to be relatively low compared with more urbanized areas. Ambient noise level measurements, however, are not available for the entire DRECP area. The acoustic environment is a resource with intrinsic value. It is important as a natural resource, a cultural resource, or both. The relatively low noise levels compared to more urbanized areas are a critical component of the desert character in general and the wilderness characteristics that the desert often supports. This relative quiet is important for wildlife communication, behavior, and other ecological processes. The sense of quiet and the natural soundscape is also important to many recreational users of the desert in general, and to recreational users of wilderness areas in particular. Wilderness areas are discussed further in Section III.18, Outdoor Recreation.

Noise- and vibration-generating activities may include but are not limited to urban environments; construction and development (including existing renewable energy development and other Bureau of Land Management (BLM)-authorized rights-of-way [ROWs]); train movements; recreational activity (such as camping, hiking, hunting, shooting, and off-road vehicles); motorized vehicle traffic on local roadways; military activity and aircraft over flights; military and U.S. Border Patrol helicopters; and mineral exploration and drilling.

III.21.3.1 Sensitive Receptors

Noise-sensitive receptors are areas of human habitation or substantial use where the intrusion of noise or vibration has the potential to adversely impact the occupancy, use, or enjoyment of the environment. Receptors can include residences, schools, hospitals, parks, and places of business requiring low levels of noise.

In addition to human receptors within the DRECP area, sensitive receptors also include wildlife. Noise-sensitive Focus Species within the DRECP area are listed in Table III.21-2. Noisy environments stress wildlife. High noise levels can adversely affect wildlife activities

including locating mates, avoiding predators, protecting young, and establishing territories. Studies over the past 40 years into the effects of noise on terrestrial wildlife, however, present conflicting information on the impacts of anthropogenic noise on any given species (Radle 2002, NPS 2011). The conflicting information is largely due to the variety of factors affecting assessment of the impacts. The following factors can affect the determination of impacts: ambient sound level, source level, character of the source, climate, vegetation, topography, and the hearing sensitivity of a species to dominant frequencies from a particular source. As noted in Section III.21.1, there are no specific noise level standards for any Focus Species within the DRECP area.

For the DRECP area, and to be conservative, it is assumed that all communities and cities contain sensitive human receptors and that noise-sensitive wildlife live in all ecoregion subareas. Communities and cities, by DRECP area ecoregion subarea, are discussed in several chapters of this document, including Chapter III.11, Land Use and Policies and Chapter III.20, Visual Resources. Table III.21-3 provides typical noise levels for various environments. Wildlife resources, including noise-sensitive species within the DRECP area, are discussed in detail in Chapter III.7, Biological Resources.

Table III.21-2
Sensitive Biological Resources

Taxa	Common Name	Scientific Name	Noise-Sensitive	Impact Standard
Amphibian/ Reptile	Agassiz's desert tortoise	*Gopherus agassizii*	Not Known	NA
	Arroyo toad	*Anaxyrus (Bufo) californicus*	Yes	NA
	Flat-tailed horned lizard	*Phrynosoma mcallii*	Yes	NA
	Mojave fringe-toed lizard	*Uma scoparia*	Yes	NA
	Tehachapi slender salamander	*Batrachoseps stebbinsi*	Not Known	NA
Bird	Arizona Bell's vireo	*Vireo bellii arizonae*	Yes	NA
	Bendire's thrasher	*Toxostoma bendirei*		NA
	Burrowing owl	*Athene cunicularia*	Yes	NA
	California black rail	*Laterallus jamaicensis coturniculus*		NA
	California condor	*Gymnogyps californianus*		NA
	Elf owl	*Micrathene whitneyi*	Yes	NA
	Gila woodpecker	*Melanerpes uropygialis*	Yes	NA
	Golden eagle	*Aquila chrysaetos*		NA
	Greater sandhill crane	*Grus canadensis tabida*		NA
	Least Bell's vireo	*Vireo bellii pusillus*	Yes	NA

Table III.21-2
Sensitive Biological Resources

Taxa	Common Name	Scientific Name	Noise-Sensitive	Impact Standard
	Mountain plover	*Charadrius montanus*	Yes	NA
	Swainson's hawk	*Buteo swainsoni*		NA
	Tricolored blackbird	*Agelaius tricolor*		NA
	Western yellow billed cuckoo	*Coccyzus americanus occidentalis*		NA
	Willow flycatcher (including southwestern)	*Empidonax traillii* (including *extimus*)		NA
	Yuma clapper rail	*Rallus longirostris yumanensis*		NA
Fish	Desert pupfish	*Cyprinodon macularius*	Not Known	NA
	Mohave tui chub	*Siphateles [Gila] bicolor mohavensis*	Not Known	NA
	Owens pupfish	*Cyprinodon radiosus*	Not Known	NA
	Owens tui chub	*Siphateles [Gila] bicolor snyderi*	Not Known	NA
Mammal	Bighorn sheep (Peninsular Ranges distinct population segment (DPS) and Nelson's)	*Ovis canadensis nelsoni*	Not Known	NA
	Burro deer	*Odocoileus hemionus eremicus*	Not Known	NA
	California leaf-nosed bat	*Macrotus californicus*	Yes	NA
	Desert kit fox	*Vulpes macrotis arsipus*	Not Known	NA
	Mohave ground squirrel	*Spermophilus [Xerospermophilus] mohavensis*	Not Known	NA
	Mohave River vole	*Microtus californicus mohavensis*	Not Known	NA
	Pallid bat	*Antrozous pallidus*	Not Known	NA
	Townsend's big-eared bat	*Corynorhinus townsendii*	Yes	NA

Table III.21-3
Typical Noise Levels in A-Weighted Decibel Scale

Environment	Noise Level
Carrier Flight Deck	140
	130
	120
Rock Music Concert or Inside Subway Station (New York)	110
	100
Boiler Room or Printing Press Plant	90
Higher Limit of Urban Ambient Sound	80
	70
Data Processing Center or Department Store	60
Large Business Office or Quiet Urban Daytime	50
Quiet Urban Nighttime	40
Library and Bedroom at Night, Quiet Rural Nighttime or Secluded Wilderness	30
Broadcast and Recording Studio	20
	10
	0

III.21.4 Sensitive Receptors by Ecoregion Subarea

This section, organized by ecoregion subarea, describes sensitive receptors for human and wildlife communities throughout the DRECP area.

III.21.4.1 Cadiz Valley and Chocolate Mountains Ecoregion Subarea

Communities and cities found within the Cadiz Valley and Chocolate Mountains ecoregion subarea are shown in Appendix R1, Figure R1.21-1. This ecoregion subarea includes Palo Verde, Ripley, East Blythe, Blythe, Ehrenberg (immediately adjacent to the ecoregion subarea boundary), Desert Center, Midland, Rice, Vidal, Big River, Parker, Bluewater, Vidal Junction, and Chubbuck. Wildlife resources within the Cadiz Valley and Chocolate Mountains ecoregion subarea are discussed in Chapter III.7, Sections III.7.5 and III.7.6.

III.21.4.2 Imperial Borrego Valley Ecoregion Subarea

Communities and cities found within the Imperial Borrego Valley ecoregion subarea are shown in Figure R1.21-2 and include Yuma (immediately adjacent to the ecoregion subarea boundary), Andrade, Ogilby, Holtville, Calexico, Heber, El Centro, Imperial, Seeley, Plaster City, Coyote Wells, Ocotillo, Brawley, Glamis, Westmorland, Calipatria, Niland, and Borrego

Springs. Wildlife resources within the Imperial Borrego Valley ecoregion subarea are discussed in Sections III.7.5 and III.7.6.

III.21.4.3 Kingston and Funeral Mountains Ecoregion Subarea

Communities and cities found within the Kingston and Funeral Mountains ecoregion subarea shown in Figure R1.21-3 and include Kingston, Cima, Ivanpah, Nipton, Tecopa, and Shoshone. Wildlife resources within the Kingston and Funeral Mountains ecoregion subarea are discussed in Sections III.7.5 and III.7.6.

III.21.4.4 Mojave and Silurian Valley Ecoregion Subarea

Communities and cities found within the Mojave and Silurian Valley ecoregion subarea include Newberry Springs, Daggett, Yermo, Afton, Crucero, Red Mountain, and Johannesburg (see Figure R1.21-4). Wildlife resources within the Mojave and Silurian Valley ecoregion subarea are discussed in Sections III.7.5 and III.7.6.

III.21.4.5 Owens River Valley Ecoregion Subarea

Communities and cities found within the Owens River Valley ecoregion subarea include Little Lake, Haiwee, Olancha, Cartago, Bartlett, Keeler, Lone Pine, Owenyo, and Independence (see Figure R1.21-5). Wildlife resources within the Owens River Valley ecoregion subarea are discussed in Sections III.7.5 and III.7.6.

III.21.4.6 Panamint Death Valley Ecoregion Subarea

Communities and cities found within the Panamint Death Valley ecoregion subarea include Searles, Westend, Trona, Searles Valley, and Death Valley (see Figure R1.21-6). Wildlife resources within the Kingston and Funeral Mountains ecoregion subarea are discussed in Sections III.7.5 and III.7.6.

III.21.4.7 Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

Communities and cities found within the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea include Twentynine Palms, Joshua Tree, Morongo Valley, Lucerne Valley, Apple Valley, Victorville, and Newberry Springs (see Figure R1.21-7). Wildlife resources within the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea are discussed in Sections III.7.5 and III.7.6.

III.21.4.8 Piute Valley and Sacramento Mountains Ecoregion Subarea

Communities and cities found within the Piute Valley and Sacramento Mountains ecoregion subarea include Needles and Topock, which are immediately adjacent to both the DRECP

area and the ecoregion subarea boundary (see Figure R1.21-8). Wildlife resources within the Piute Valley and Sacramento Mountains ecoregion subarea are discussed in Sections III.7.5 and III.7.6.

III.21.4.9 Providence and Bullion Mountains Ecoregion Subarea

Communities and cities found within the Providence and Bullion Mountains ecoregion subarea include Cadiz, Amboy, Bagdad, Essex, Fenner, Goffs, and Ludlow (see Figure R1.21-9). Wildlife resources within the Providence and Bullion Mountains ecoregion subarea are discussed in Sections III.7.5 and III.7.6.

III.21.4.10 West Mojave and Eastern Slopes Ecoregion Subarea

Communities and cities found within the West Mojave and Eastern Slopes ecoregion subarea are shown on Figure R1.21-10. They include Summit (immediately adjacent to the DRECP area and the ecoregion subarea boundary), Hesperia, Mountain View Acres, Adelanto, Oro Grande, Pearblossom, Littlerock, Acton (immediately adjacent to, but outside the DRECP area and ecoregion subarea boundary), Palmdale, Desert View Highlands, Quartz Hill, Elizabeth Lake, Lake Hughes (immediately adjacent to, but outside the DRECP area and ecoregion subarea boundary), Lancaster, Lake Los Angeles, Helendale Hodge, Daggett, Lenwood, Hinkley, Kramer Junction, Boron, North Edwards, Rosamond, California City, Mojave, Monolith, Tehachapi, Golden Hills, Cantil, Atolia, Saltdale, Garlock, and Ridgecrest. Wildlife resources within the West Mojave and Eastern Slopes ecoregion subarea are discussed in Sections III.7.5 and III.7.6.

III.21.5 Noise and Vibration Environment Outside of DRECP Area

The affected environment outside of the DRECP area is described because of the potential for transmission lines to be required in these areas. Transmission lines could be required in four geographic areas: San Diego County, Los Angeles County, North Palm Springs–Riverside, and the Central Valley.

The federal and state regulatory setting presented in Section III.21.1 encompasses all the transmission corridors outside the DRECP area. Due to the universal nature of noise and vibration fundamentals, the environmental setting presented in Section III.21.2 encompasses all Transmission Outside of DRECP area corridors as well.

A wide range of noise sources and sensitive receptors are found along each Outside of DRECP area corridor. The environmental setting and ambient noise conditions along these corridors vary from rural and undeveloped to highly urban. Ambient noise adjacent to the corridors is lower in rural settings and higher in urban settings, particularly where urban

settings include roadways with heavy traffic. Notable noise-sensitive land uses located adjacent to corridors include school facilities, churches, medical facilities, park facilities, recreational lands, cemeteries, and residences.

Each of the four Outside of DRECP area corridors follows existing major 500 kV ROWs. Perceptible noise generated from the construction and operation of transmission infrastructure (including substations) generally falls into the following four broad categories.

1. **Construction.** Recent construction of 500 kV transmission lines and substations within the Outside of DRECP area corridors has caused periodic noise levels ranging from greater than 83 dBA at 50 feet to 52 dBA at approximately 3,200 feet from the source. However, construction noise is short-term and temporary and therefore does not cause a permanent increase in ambient noise levels at receptor locations immediately adjacent to any transmission ROW or substation location.
2. **Operations and Maintenance (O&M) Activities.** O&M activities are similar to construction, except that they are short-term and temporary and do not cause a permanent increase in ambient noise levels at receptor locations immediately adjacent to any transmission ROW or substation location.
3. **Corona Discharge Noise From Transmission Infrastructure and Substations.** The effects of high-voltage transmission lines fall into two broad categories: corona effects and electric field effects. Corona is the ionization of the air at the surface of the energized conductor and suspension hardware, caused by the very high electric field strength at the surface of the metal under certain conditions. The amount of corona produced by a transmission line is a function of the voltage of the line, the diameter of the conductor (or bundle of conductors), the elevation of the line above sea level, the condition of the conductor and hardware, and local weather conditions. Corona typically becomes a design concern for transmission lines at 345 kV and greater, and is less noticeable on lines operated at lower voltages.
4. **Corona generates audible noise during the operation of transmission lines.** The noise is generally described as a crackling, hissing, or humming noise. The noise is most noticeable during rain or fog when the conductor is wet. Background noise at locations beyond the edge of the ROW often masks audible noise from transmission lines, particularly where the line runs near a source of background noise, such as a freeway. During wet weather conditions, the conductor will produce the greatest amount of corona noise. However, during heavy rain the ambient noise generated by the falling raindrops is typically greater than the noise generated by corona.

III.22 PUBLIC HEALTH, SAFETY, AND SERVICES

This chapter identifies potential effects on public health, safety, and services as they relate to the Desert Renewable Energy Conservation Plan (DRECP) Bureau of Land Management (BLM) Land Use Plan Amendment (LUPA). Issues addressed include hazardous materials, airport safety, wildland fire, public services, and public health and safety hazards, including Valley Fever (see Section III.22.2.6.1).

III.22.1 Regulatory Setting

III.22.1.1 Occupational Safety and Health Act

The Occupational Safety and Health Act of 1970 protects occupational health and safety rights for individuals in the workplace (29 United States Code [U.S.C.] 651 et seq.). Congress created the Occupational Safety and Health Administration (OSHA), a U.S. Department of Labor agency, to set and enforce standards including training, outreach, education, and continuing improvements in workplace safety and health. State and local jurisdictions may have additional laws and regulations that further strengthen provisions of this act.

III.22.1.2 Comprehensive Environmental Response, Compensation, and Liability Act

The manufacture, transport, and disposal of hazardous and toxic wastes have become an important issue in desert areas, where potential impacts may be perceived as less harmful than in other areas. Under provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), a provision known as Superfund defines a hazardous substance as any material that the U.S. Environmental Protection Agency (EPA) has designated for special consideration under the Clean Air Act, Clean Water Act, Toxic Substances Control Act, or the Resource Conservation and Recovery Act (RCRA; EPA 2013).

The EPA may also designate additional substances as hazardous under CERCLA. Hazardous wastes or substances can be hazardous to human health or the environment when they are improperly managed and possess at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity) or appear on other EPA lists of substances deemed to be hazardous.

III.22.1.3 Superfund Amendments and Reauthorization Act

The Superfund Amendments and Reauthorization Act established the Emergency Planning and Community Right-to-Know Act as the national legislation on community safety. This law helps local communities protect public health, safety, and the environment from releases of hazardous substances. In implementing provisions of the Emergency Planning and Community Right-to-Know Act, Congress requires each state to

appoint a State Emergency Response Commission. Each state commission then must divide its state into Emergency Planning Districts and appoint a Local Emergency Planning Committee for each of those districts.

III.22.1.4 Resource Conservation and Recovery Act

RCRA focuses on preventing adverse impacts from hazardous wastes. The three primary goals of the act are to (1) protect human health and the environment from the potential hazards of waste disposal, (2) reduce the amount of waste generated, and (3) ensure that wastes are managed in an environmentally sound manner (EPA 2013). In 1984, Congress enacted the Hazardous and Solid Waste Amendments, which expanded RCRA to require hazardous wastes management from initial manufacture to final disposal.

III.22.1.5 Federal Aviation Administration Regulations

Federal Aviation Administration (FAA) Regulations, Part 77, establish standards for identifying and assessing obstructions to air navigation. Part 77, Subpart C, specifically limits structure heights near airports. FAA regulations (49 Code of Federal Regulations [CFR] Part 77) require the following project review:

- Any project that includes one of the following must complete a Part 77 Determination of No Hazard to Air Navigation prior to construction:
  - Any construction or alteration exceeding 200 feet above ground level
  - Any construction or alteration:
    - Within 20,000 feet of a public use or military airport that exceeds a 100:1 surface from any point on the runway of each airport with at least one runway more than 3,200 feet
    - Within 10,000 feet of a public use or military airport that exceeds a 50:1 surface from any point on the runway of each airport with its longest runway no more than 3,200 feet
    - Within 5,000 feet of a public use heliport that exceeds a 25:1 surface
- Any highway, railroad or other traverse way whose prescribed adjusted height would exceed the above noted standards
- When requested by the FAA
- Any construction or alteration located on a public use airport or heliport regardless of height or location

III.22.1.6 Other Federal Regulations

Other applicable hazardous substances regulations include the Federal Insecticide, Fungicide and Rodenticide Act, the Safe Drinking Water Act, and the Pollution Prevention Act of 1990.

III.22.2 Public Health, Safety, and Services in the Land Use Plan Amendment Decision Area

The BLM has responsibility to address known public health and safety concerns on public lands to reduce risks to visitors and employees. Potential dangers may include abandoned mine lands, explosives and munitions, hazardous materials, industrial hazards, and naturally occurring hazards. There are inherent risks to visiting public lands beyond these identified potential dangers such as trips and falls while hiking, altercations with other public land users, use of off-highway vehicle equipment, travel on primitive and unmaintained routes, presence of wildlife and poisonous plants, and heat and cold exposure.

Public health and safety responsibilities are shared among several federal and state agencies including: EPA, OSHA, and California environmental regulatory agencies such as the Department of Toxic Substances Control, Integrated Waste Management Board, Air Resources Board and the Regional Water Quality Control Boards.

III.22.2.1 Hazardous Materials

III.22.2.1.1 Generators of Hazardous Materials

There are no large industrial or commercial users of hazardous materials in the LUPA Decision Area. There are, however, identified hazardous or toxic materials and small-quantity generators associated with accidental spills, purposeful illegal dumping, air emissions, and other uncontrolled discharges into the environment. Improper use and management of these materials pose a significant threat to the environment.

Fuels, oils, lubricants, and solvents are the primary hazardous and flammable materials associated with renewable energy resource development. These substances are typically on site during the construction and operation of the facilities. These substances are also required for the operation of construction equipment. Small quantities of additional common hazardous materials typically used on site during construction include antifreeze and used coolant, latex and oil-based paint, paint thinners and other solvents, cleaning products, and herbicides (BLM and Department of Energy 2012).

During the operation and maintenance of renewable energy facilities, small quantities of hazardous materials typically are transported, used, and disposed of on a routine or

periodic basis. These materials consist of minor amounts of petroleum products (fuels and lubricating oils) and small-to-moderate amounts of motor vehicle fuel.

III.22.2.1.2 Areas of Known Hazardous Contamination

BLM engages in hazardous material emergency response actions, site evaluations, and prioritization of cleanups in accordance with federal, state and local laws and regulations. BLM works with the EPA, state environmental health departments, counties, and potentially responsible parties (public and private) to fund and provide oversight in the cleanup of hazardous materials sites. Sites that are an imminent threat to public health and safety as well as sites under a regulatory administrative order are a priority for BLM.

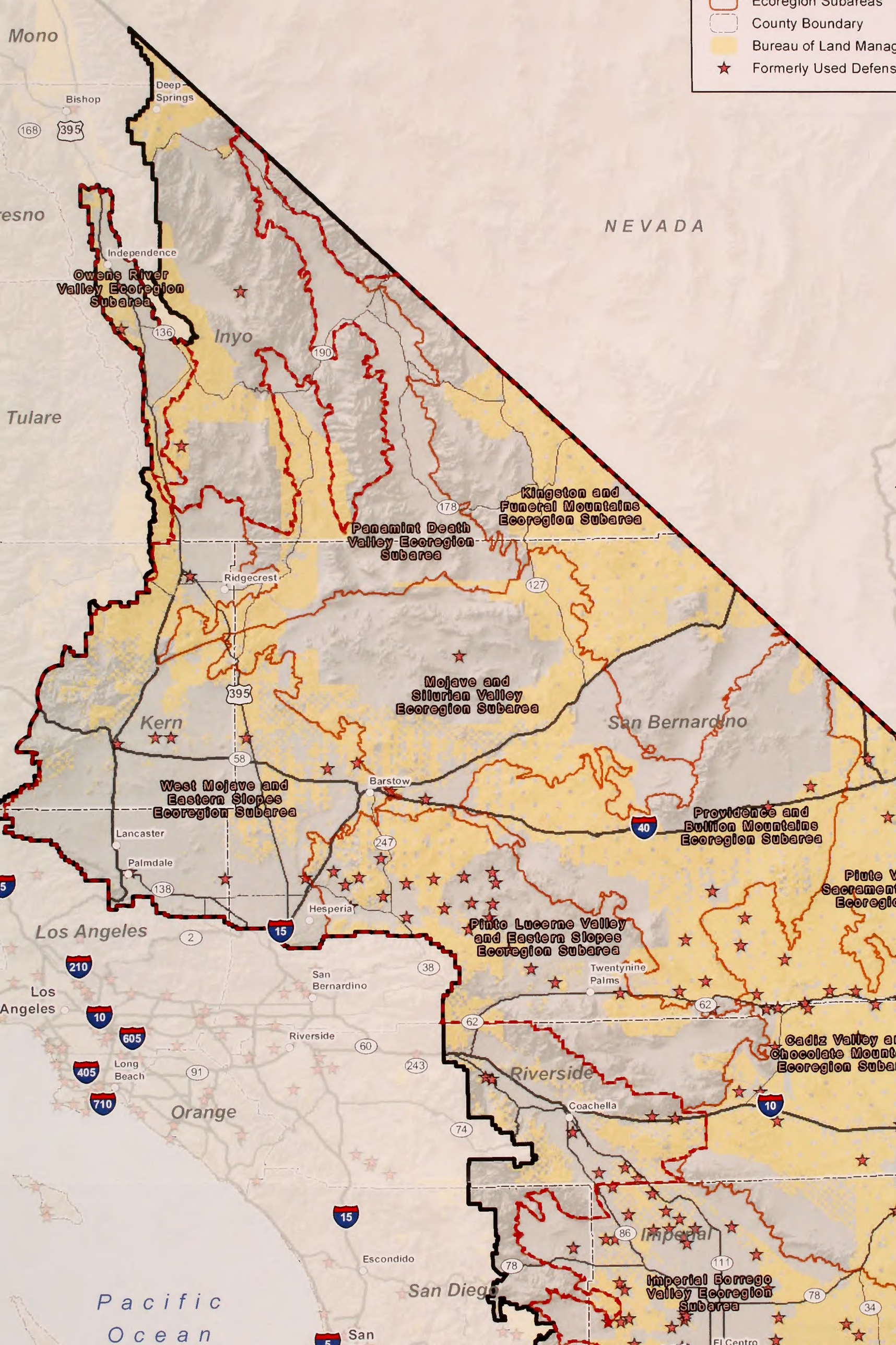
Many known hazardous contamination areas are throughout the LUPA Decision Area. Examples of contamination include diesel leakage from failure of a truck's fuel pump, improper disposal of paint cans, and leaching of chemicals from abandoned mines and mining equipment. Currently no known RCRA or CERCLA hazardous contamination cleanup sites are within BLM-managed lands in the LUPA Decision Area.

The military has been active in the California desert for more than 200 years. In addition to current military operations (see Chapter III.24), there are 112 formerly used defense sites in the LUPA Decision Area (Figure III.22-1). Unexploded ordnance, exploded ordnance residue, and munitions from World War II training exercises have been found at many of these sites.

III.22.2.2 Airport Safety Hazards

Over 30 active airports are in the LUPA Decision Area (see Figure III.22-2). Airports can pose safety hazards to surrounding areas, and surrounding areas can in turn pose safety hazards to airports. Existing areas surrounding airports are generally affected by noise levels and accidents from take offs and landings. Surrounding areas can affect airport safety if tall structures project into airspace travel areas or other features interfere with flight. Airport Land Use Compatibility Plans (ALUCPs) address these issues. New development may also require FAA review.

ALUCPs typically identify zones for (1) runway protection and building restrictions, (2) inner approach/departure and adjacent to runway, (3) extended approach/departure, (4) primary traffic patterns, (5) other airport environs, and (6) special land use. Each zone would have, as applicable, prohibited uses and development conditions. Prohibited uses could include developments affected by high noise levels such as libraries or schools, developments with a large population in a potential accident area, storage of hazardous materials, or structures that would potentially interfere with airspace.


Ecoregion Subareas
County Boundary
Bureau of Land Manag
Formerly Used Defens
Mono
Bishop
Deep Springs
168
395
esno
NEVADA
Independence
Owens River Valley Ecoregion Subarea
136
Inyo
190
Tulare
178
Kingston and Funeral Mountains Ecoregion Subarea
Panamint Death Valley Ecoregion Subarea
Ridgecrest
127
395
Mojave and Silurian Valley Ecoregion Subarea
Kern
San Bernardino
58
Barstow
West Mojave and Eastern Slopes Ecoregion Subarea
40
Providence and Bullion Mountains Ecoregion Subarea
Lancaster
247
Palmdale
138
Hesperia
Los Angeles
2
15
Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea
210
38
Twentynine Palms
San Bernardino
Los Angeles
10
62
605
Riverside
60
Cadiz Valley a
Chocolate Mount
Ecoregion Suba
405
Long Beach
91
243
Riverside
710
Orange
Coachella
10
74
15
86
Imperial
Escondito
78
111
Imperial Borrego Valley Ecoregion Subarea
San Diego
78
34
Pacific Ocean
San
El Centro

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Sources: ESRI (2014), BLM (2015), RECON (2015)

FIGURE III.22-2

Airports in the LUPA Decision Area

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The FAA must review structures 200 feet or higher, projects within 20,000 feet of the airport, or any other project it chooses to review (49 CFR Part 77). These development reviews are intended to avoid interference with airports and control airport safety issues.

III.22.2.3 Wildland Fire Hazards

Although historically infrequent in the southwestern deserts, fire has increased in both frequency and extent in recent decades generally due to increased vegetation fuel provided by the invasion of non-native annual grasses such as red brome and buffelgrass (Brooks, Matchett, and Berry 2006; Abella 2010). Within the LUPA Decision Area, the largest acreages burned in 1999, 2005, 2006, and 2007 (California Department of Forestry and Fire Protection [CAL FIRE] 2009).

On public lands (including all BLM-managed lands in California), wildland fire is managed through an interagency policy implemented in 1995 called the Federal Wildland Fire Management Policy (FWFMP), as updated in 2001. The Secretaries of the U.S. Department of Interior and U.S. Department of Agriculture developed the FWFMP to respond to increases in frequency, size, and catastrophic nature of wildland fires in the United States. Under the FWFMP, guidance is provided for the consistent implementation of fire policy. BLM field offices in the LUPA Decision Area use the FWFMP guidance to develop fire management plans and implement strategies for wildland fire suppression, prescribed fire projects, and nonfire fuels management.

In California, five federal fire management agencies and CAL FIRE have entered into an agreement called the California Master Cooperative Wildland Fire Management and Stafford Act Response Agreement (known as the CFMA). This agreement provides the framework for the mutual cooperation of the fire management agencies to suppress fires on intermingled private and public land within the state. Through this agreement and with oversight from the California Wildfire Coordinating Group, the state is divided into direct protection areas, delineated by boundaries regardless of statutory responsibility, where fire protection is assumed by administrative units of either federal or state agencies. Therefore, in some areas BLM is responsible for protecting lands other than public land, and in other areas another federal or state agency is responsible for fire suppression on public lands. Regardless of the actual responsibility for a specific area, the closest available fire suppression resources will respond to a given fire under the mutual aid agreements established in the CFMA.

Where another agency provides suppression protection for BLM, the responsible agency strives to protect the land in the way the jurisdictional agency would protect it. The agencies have local operating plans and meet annually to discuss fire suppression tactics and special suppression considerations for all lands. For special areas, such as Areas of Critical

Environmental Concern, BLM often prepares a Modified Suppression Plan that outlines areas of special concern and the suppression tactics to use in these areas.

In 2010, the Board of Forestry and Fire Protection adopted the Strategic Fire Plan for California (CAL FIRE 2010). The California Fire Plan, a cooperative effort managed by CAL FIRE, is the state's road map for reducing the risk of wildfire. The largest and most visible part of CAL FIRE operations is fire suppression. Operational units are organized to address fire suppression over a geographic area, divided by region (north or south). California has 21 operational units that geographically follow county lines. Each unit consists of one to three counties.

There are four operational units in the LUPA Decision Area: the Kern County Unit, Riverside County Unit, San Bernardino Unit (includes Inyo, Mono [not part of the LUPA Decision Area], and San Bernardino counties), and the San Diego Unit (includes Imperial and San Diego counties).

III.22.2.4 Public Services

Public services are those functions that serve residents on a communitywide basis. These functions include parks and recreation, emergency services, and schools. Chapter III.18, Outdoor Recreation, discusses existing conditions recreation areas. Existing conditions for emergency services are discussed below.

III.22.2.4.1 Emergency Services

Levels of Responsibility

Federal agencies implement emergency programs such as the Emergency Alert System through the Federal Communications Commission, Federal Emergency Management Agency (FEMA), and the National Weather Service. The National Interagency Fire Center is the nation's support center for wildland firefighting. Seven federal and state agencies are based at National Interagency Fire Center and work together to coordinate and support wildland fire and disaster operations.

State agencies, specifically California Office of Emergency Services (Cal OES) as the lead agency for state-led responses, may call upon local and county agencies to respond to emergencies in and outside the state. During a serious emergency, Cal OES may use the services of the California National Guard, California Highway Patrol, Caltrans, CAL FIRE, and the Department of Social Services.

County agencies provide local assistance in unincorporated areas. These agencies also provide support for local jurisdictions when local governments cannot control a particular emergency situation.

Local agencies respond to emergencies within their boundaries. Jurisdictions may call upon other agencies and their services if they cannot resolve specific situations in their jurisdictions.

Emergency Alert System

The Emergency Alert System is the nationwide emergency alert program that provides information to the president on national emergencies. Emergency Alert System plans are part of the State of California State Emergency Alert System (State of California 2004), which replaces Emergency Broadcast System plans and procedures. At the local level, Emergency Alert System participants can transmit emergency information through the governor, Cal OES, California Highway Patrol, or the National Weather Service. The following regions in the LUPA Decision Area have local Emergency Alert System public plans: Riverside–San Bernardino, San Diego, Los Angeles, Kern, Inyo-Mono, and Imperial.

BLM Law Enforcement

The BLM has specific resource protection and law enforcement responsibilities that relate to its resource management mission. Many federal laws and regulations relate to public lands and resources. These laws and regulations are often quite unique in that they apply only to federal lands and have no counterparts in state law.

Law Enforcement Rangers (uniformed officers) and Special Agents (criminal investigators) enforce a wide range of laws and regulations in the prevention, detection, and investigation of crimes affecting public lands resources. These crimes include, but are not limited to, mineral resource theft; wilderness area violations; hazardous materials dumping; archaeological and paleontological resource theft and vandalism; cultivation, manufacture, smuggling, and use of illegal drugs; timber, forest product, and native plant theft; off-highway vehicle use; alcohol-related crimes; and wildland arson. BLM law enforcement personnel work cooperatively with other state and federal law enforcement agencies to protect the public and investigate crimes within public lands.

III.22.2.5 Naturally Occurring Hazards

Natural hazards include active fault or seismic zones, areas prone to landslides, caves, potentially toxic minerals (such as arsenic, asbestos, and mercury), and the presence of hazardous organisms (such as dangerous plants, wildlife, fungi, and micro-organisms).

The LUPA Decision Area is in one of the most seismically active regions in the United States; some areas have a greater than 99% probability of a 6.7 magnitude earthquake within 30 years. The 2007 Working Group on California Earthquake Probabilities produced the Uniform California Earthquake Rupture Forecast, which is the first comprehensive report to compare earthquake probabilities throughout California. According to this report, the southern San Andreas Fault has the highest probability (59%) of generating at least one magnitude 6.7 earthquake or larger in the next 30 years (Southern California Earthquake Center 2007). For details on geologic hazards and faults in the LUPA Decision Area, see Chapter III.4, Geology and Soils.

III.22.2.6 Public Health and Safety Hazards

Construction of a renewable energy project entails activities such as (1) establishing site access; (2) excavating for site clearance and site development; (3) installing towers, solar panels, and other energy accumulating equipment; (4) constructing associated buildings, electrical substations, and access roads; (5) routine maintenance; and (6) eventual decommissioning. Construction and operations workers at any facility are subject to the risk of injury or death from physical hazards. While such occupational hazards are relatively rare and can be minimized when workers adhere to safety standards and use appropriate protective equipment, fatalities and injuries from on-the-job accidents can still happen. An additional hazard is that many construction activities in the LUPA Decision Area take place outdoors in remote locations, without nearby emergency response providers.

Occupational safety and health are protected through OSHA, (29 U.S.C. 651 et seq.). States may, however, adopt laws or regulations that exceed OSHA safety standards. Some occupational hazards associated with energy projects are similar to those in all heavy construction and electric power industries, while others are unique to a specific type of renewable energy facility such as wind, solar, or geothermal. Accident rates have been tabulated for most types of work, and risks can and have been calculated on the basis of historical industrywide statistics for use in a site-specific impact assessment.

The U.S. Bureau of Labor Statistics and the National Safety Council maintain statistics on the annual number of injuries and fatalities by industry type (National Safety Council 2011). The expected annual number of worker fatalities and injuries for specific industry types can be calculated based on Bureau of Labor Statistics and National Safety Council rate data and the number of annual full-time-equivalent workers required for construction and operations.

III.22.2.6.1 Valley Fever

Valley fever is an infectious disease caused by inhaling the spores of *Coccidioides immitis*, a soil-dwelling fungus. Spores, or arthroconidia, are released into the air when infected soils are disturbed (e.g., soil disturbance may occur during construction activities, agricultural operations, dust storms, or during earthquakes). Typical symptoms of valley fever include fatigue, fever, cough, headache, shortness of breath, rash, muscle aches, and joint pain. Symptoms of advanced valley fever include chronic pneumonia, meningitis, skin lesions, and bone or joint infections (Valdivia et al. 2006). Valley fever is endemic (native and common) in the semiarid regions of the southwestern United States, including the LUPA Decision Area.

This infection can occur year-round and tends to occur in areas with dry soil and desert-like weather conditions that allow the fungus to grow. About 60% of people infected with valley fever have no symptoms and their immune systems fight the infection naturally. For those people who do get sick, symptoms can last a month or more, but the majority experience a full recovery. Most people who have been infected with valley fever become immune and will not get the infection again (California Department of Public Health, Division of Communicable Disease Control 2013).

Valley fever spores survive in the top 2 to 12 inches of soil in many parts of California. When soil is disturbed by activities such as grading, digging, vehicle operation on dirt roads, or high winds, the fungal spores can become airborne and potentially inhaled by workers, recreationists, or residents in the area. Certain occupations have an increased risk of exposure to valley fever, such as construction, agriculture, and archaeology. These jobs typically involve disturbance of soils where fungal spores may be found. Domestic and native animals are also susceptible to valley fever, including dogs, cats, horses, cattle, coyotes, rodents, bats, and snakes.

The fungal spores are more likely to be present in soils of the Central Valley of California but are also present in other areas. Based on data from the California Division of Occupational Safety and Health, the California counties with the highest rates of valley fever are Merced, Madera, Fresno, Tulare, Kern, Monterey, Kings, and San Luis Obispo (California Division of Occupational Safety and Health 2013). Valley fever infection rates are highest in California from June to November.

III.22.3 Public Health, Safety, and Services Issues—Transmission Outside the DRECP Area

The transmission required outside the DRECP area includes four geographic areas: San Diego, Los Angeles, North Palm Springs–Riverside, and the Central Valley.

The federal and state regulatory environment (see Sections III.22.1.1 and III.22.1.2) also applies to all outside the DRECP area corridors. Additionally, due to the universal nature of public health and safety resources, the environmental setting presented encompasses all outside the DRECP area corridors, with the exception of the areas of known hazardous contamination sites (see Section III.22.2.1.2).

Each of these four outside the DRECP area corridors follows existing 500 kV transmission line rights-of-way. Land uses within the corridors are primarily large-scale transmission infrastructure and substations. No known sites within the outside the DRECP area corridors have been identified as cleaned under RCRA or CERCLA. However, current construction projects and the ongoing operation and maintenance of transmission facilities and substations within the outside the DRECP area corridors could cause site-specific incidents of contamination, including oil and fuel spills and improper paint can disposal.

III.23 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

This chapter describes the laws and regulations that govern socioeconomic and environmental justice issues. It also describes the existing environment within the Bureau of Land Management's (BLM) Land Use Plan Amendment (LUPA) Decision Area, which encompasses the entire Desert Renewable Energy Conservation Plan (DRECP) boundary. Existing conditions for the DRECP area are presented regarding socioeconomics (including community workforce, available housing, and fiscal status of counties) and environmental justice (including data on existing minority and low-income communities). Appendix R1.23 provides supporting information for this chapter, specifically two maps and one table. The maps illustrate the locations of census tracts identified as containing minority and low-income populations relevant to environmental justice, and the table presents baseline demographic data used in the environmental justice analysis presented in Chapter IV.23.

III.23.1 Regulatory Setting

III.23.1.1 Federal

Executive Order 12898

In 1994 President Clinton issued the Executive Order, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, to focus federal attention on environmental and human health conditions in minority and low-income communities. EO 12898 promotes nondiscrimination in federal programs that substantially affect human health and the environment, and it provides information access and public participation relating to these matters. This order requires federal agencies (and state agencies receiving federal funds) to identify and address any disproportionately high or adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations. The Council on Environmental Quality (CEQ) oversees federal compliance with EO 12898.

Council on Environmental Quality's Environmental Justice Guidance Under the National Environmental Policy Act

To ensure that environmental justice concerns are effectively identified and addressed according to EO 12898, the CEQ, in consultation with the Environmental Protection Agency (EPA), developed guidance to assist federal agencies to implement procedures. According to the CEQ's "Environmental Justice Guidance Under NEPA," agencies should consider the composition of affected areas to determine whether minority or low-income populations are affected by a proposed action, and, if so, whether those environmental effects may be disproportionately high or adverse (CEQ 1997).

According to the CEQ environmental justice guidelines, minority populations should be identified if:

- A minority population percentage either exceeds 50% of the population of the affected area, or
- If the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (e.g., a governing body's jurisdiction, neighborhood census tract, or other similar unit).

Environmental Protection Agency Final Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses

EPA's "Final Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses" defines how EPA will ensure that disproportionately high and adverse human health or environmental effects on minority communities and low-income communities are identified and addressed. It establishes agencywide goals for engaging American Indian, Alaska Native, and other indigenous peoples (e.g., Native Hawaiian). It also establishes agencywide goals for environmental protection and lists actions the EPA would take to incorporate environmental justice into its mission (EPA 1998).

Environmental Protection Agency Plan Environmental Justice 2014

EPA's Plan Environmental Justice (EJ) 2014 is a strategy to help the agency integrate environmental justice into its programs, policies, and activities. Plan EJ 2014 identifies Cross-Agency Focus Areas, Tools Development, and Program Initiatives as the three essential elements that will advance environmental justice across the EPA and other agencies of the federal government. Plan EJ 2014 is not yet a rule or regulation; it is a strategy to help integrate environmental justice into EPA's day to day activities (EPA 2011).

Bureau of Land Management Land Use Planning Handbook, Appendix D

The DRECP area includes the following BLM field office jurisdictions:

- Bakersfield
- Ridgecrest
- Barstow
- Needles
- Palm Springs–South Coast
- El Centro

Appendix D (Social Science Considerations in Land Use Planning Decisions) of the BLM Land Use Planning Handbook provides guidance on integrating social science information into the planning process for projects within BLM lands. Any information gathered for planning purposes must be considered in the context of BLM's legal mandates. To be effective, social scientific data and methods identified in Appendix D must be integrated into the entire planning process (BLM 2005). Furthermore, Section IV (Environmental Justice Requirements) of Appendix D provides guidance for assessing potential impacts on population, housing, and employment as they relate to environmental justice. It also describes variables such as lifestyles, beliefs and attitudes, and social organizations with respect to environmental justice.

III.23.2 Social and Economic Conditions

This section describes existing social and economic conditions in the DRECP area within the overall LUPA Decision Area. The affected environment comprises the overall environmental setting against which the Proposed LUPA's effects are considered and ultimately judged. These terms therefore signify a discussion of existing conditions with respect to socioeconomic resources and environmental justice populations. This section uses best-available recent data to establish those existing socioeconomic resource conditions in environmental justice populations.

This chapter features a different format than other chapters in this volume because socioeconomic and demographic resources are typically evaluated with both quantitative and qualitative demographic data and social factors. The information presented here is organized to best support a combination quantitative and qualitative programmatic methodology based on various socioeconomic factors (community workforce, available housing, fiscal status of counties, etc.).

The DRECP area is contained within parts of seven California counties: Imperial, Inyo, Kern, Los Angeles, Riverside, San Bernardino, and San Diego. BLM administers about 10 million acres of land within the DRECP area. In presenting existing conditions of socioeconomic resources in environmental justice populations, unique considerations create differing "study area" boundaries for each socioeconomic resource area. For example, the study area for employment serving the DRECP area extends beyond the boundary. This is because some construction personnel will come from outside the DRECP area to work on future renewable projects within the boundary. However, the study area for temporary housing serving construction workers is within the DRECP, as workers would seek temporary housing proximate to work locations. Section III.23.2.1 discusses individual socioeconomic resources and the assumptions used to define each applicable study area. Following the identification of these study areas, available and representative existing (and when available, forecasted) demographic data are presented.

III.23.2.1 Socioeconomic Study Areas

While BLM administers about 10 million acres of land within the DRECP area, population and socioeconomic attributes primarily occur outside of BLM-administered lands (where little population exist and established communities do not occur). Therefore, this analysis presents socioeconomic conditions for all lands within the DRECP area (including private land), as BLM LUPA decisions would affect the social and economic conditions of communities in the areas surrounding BLM-administered lands.

Due to the size of the DRECP area, this chapter uses the terms "regional" and "localized" programmatic study areas when referring to the geographic extent of socioeconomic resources and environmental justice populations. For example, Riverside County is considered a regional study area, and the city of Blythe (contained within Riverside County) is a localized study area. For environmental justice demographics, the local study area is further reduced to the U.S. Census Tract level. Regional and local study areas are not defined boundaries but are population centers with associated socioeconomic-specific resources. This distinction is important because of geography, the nature of the resource, and because the demographics of a local study area may be different from the region itself. These study areas are separate from ecoregion subarea boundaries (see Section III.23.5). Each socioeconomic and environmental justice resource (e.g., population, housing) therefore has study areas in tandem with the overall environmental setting. Some socioeconomic study areas also extend outside the DRECP (e.g., employment).

To determine whether the Proposed LUPA would promote either population growth or otherwise affect existing housing availability, this analysis considers both existing and planned population growth, the availability of the local workforce, and housing conditions in the DRECP area. It is assumed that all construction and operations workers will either permanently or temporarily reside within the regional (counties) and local (cities and communities) study areas to work on renewable energy projects to be built and operated within the DRECP area. Based on this assumption, the regional study area for population growth and housing demand (due to worker in-migration) would be the seven counties containing in the DRECP area.

Future renewable energy and infrastructure projects within the western portion of the DRECP area would be near the cities of Los Angeles and San Diego, and projects along the eastern DRECP area boundary would be near the Las Vegas and western Arizona areas. These cities are outside of the DRECP area, but some construction workers will likely come from these adjacent cities. These major metropolitan outlying areas, as well as those within the DRECP area, are therefore included within the employment study area and within both the regional and local study areas for workforce existing conditions.

To better define the localized socioeconomic study area, those incorporated cities and communities within the DRECP area with a population of 10,000 or more are identified. While some construction workers may stay in smaller communities, these larger incorporated areas would likely provide the most opportunity for vacant and temporary housing and living amenities. This programmatic analysis does not exclude considering potential impacts to smaller rural communities with populations less than 10,000. However, socioeconomic baseline condition data is not presented or analyzed in detail at this smaller level (due to the larger programmatic nature of this document). Such smaller localized and site-specific analyses, when applicable, would occur during supplemental project-level environmental reviews. See Chapter IV, Section IV.23.1.1.3, Future Project-Specific Analyses, for more information.

To define existing public finance conditions, this section focuses on counties and major landholders within the DRECP area. Future renewable energy and necessary infrastructure projects within the DRECP boundary could directly affect the tax revenue of these counties, BLM, and other lands under federal jurisdiction. Similar to employment, the larger regional study area is also considered the local study area in terms of public finance.

The BLM has determined that October 15, 2013, is the baseline date for this Final Environmental Impact Statement (EIS) (see Section III.1.3.3). The baseline includes more than 50 renewable energy projects within the DRECP area that are planned, approved, or being constructed (as listed in Appendix O). Therefore, it is likely that these projects are already influencing temporary population growth, available workforce and housing, and local economies as discussed in Sections III.23.2.2 through III.23.2.5. Individual environmental impact assessments have already been conducted for a number of the baseline projects identified in Appendix O.

III.23.2.2 Population

Table III.23-1 summarizes the current and forecasted population trends for all seven counties and the local study area cities within the DRECP boundary. As shown, significant growth is forecasted for all seven counties. No localized population centers are located within either Inyo or San Diego counties, based on the small amount of land these counties have within the DRECP boundary.

Table III.23-1
2013 Population Profile and Projections for the DRECP Area

Area	2013 Population	2020 Projected Population	2030 Projected Population	2040 Projected Population
Imperial County, CA	*180,061*	*222,920*	*259,339*	*294,585*
Brawley	25,906	N/A	N/A	N/A
Calexico	40,493	N/A	N/A	N/A
El Centro	44,327	N/A	N/A	N/A
Imperial	166,148	N/A	N/A	N/A
Inyo County, CA	*18,573*	*19,350*	*20,428*	*22,009*
Kern County, CA	*857,882*	*1,057,440*	*1,341,278*	*1,618,681*
California City	13,150	N/A	N/A	N/A
Ridgecrest	28,348	N/A	N/A	N/A
Tehachapi	13,313	N/A	N/A	N/A
Los Angeles County, CA	*9,958,091*	*10,441,441*	*10,950,335*	*11,243,022*
Lancaster	158,630	N/A	N/A	N/A
Palmdale	154,535	N/A	N/A	N/A
Riverside County, CA	*2,555,059*	*2,593,211*	*3,046,064*	*3,462,256*
Blythe	19,606	N/A	N/A	N/A
San Bernardino County, CA	*2,076,274*	*2,273,017*	*2,626,945*	*2,988,648*
Adelanto	31,289	N/A	N/A	N/A
Apple Valley	70,436	N/A	N/A	N/A
Barstow	23,168	N/A	N/A	N/A
Hesperia	91,400	N/A	N/A	N/A
Twentynine Palms	26,084	N/A	N/A	N/A
Victorville	120,368	N/A	N/A	N/A
Yucca Valley	21,030	N/A	N/A	N/A
San Diego County, CA	*3,150,178*	*3,333,995*	*3,530,896*	*3,749,240*

N/A= Data unavailable.
Source: California Department of Finance 2013a and 2013b

III.23.2.3 Housing

Table III.23-2 summarizes year 2013 housing unit availability for all seven counties within the DRECP area and the local study area cities within. As shown, the regional study area contains a high number of housing units though vacancy rates fluctuate significantly within each localized area.

Table III.23-2
2013 Housing Profile of the DRECP Area Regional and Local Study Areas

Area	Total Housing Units	Vacancy Units (Vacancy Rate)
Imperial County, CA	*56,524*	*6,952 (12.3%)*
Brawley	8,248	610 (7.4%)
Calexico	10,791	540 (5.0%)
El Centro	14,547	1,382 (9.5%)
Imperial	5,017	366 (7.3%)
Inyo County, CA	*9,491*	*1,433 (15.1%)*
Kern County, CA	*288,624*	*30,017 (10.4%)*
California City	5,226	1,113 (21.3%)
Ridgecrest	12,088	1,160 (9.6%)
Tehachapi	3,622	428 (11.8%)
Los Angeles County, CA	*3,463,382*	*204,339 (5.9%)*
Lancaster	52,334	4,867 (9.3%)
Palmdale	46,680	3,594 (7.7%)
Riverside County, CA	*812,234*	*116,149 (14.3%)*
Blythe	5,472	958 (17.5%)
San Bernardino County, CA	*704,540*	*88,068 (12.5%)*
Adelanto	9,235	1,302 (14.1%)
Apple Valley	28,259	2,713 (9.6%)
Barstow	9,632	1,474 (15.3%)
Hesperia	29,009	2,582 (8.9%)
Twentynine Palms	9,651	1,303 (13.5%)
Victorville	37,427	4,192 (11.2%)
Yucca Valley	9,583	1,284 (13.4%)
San Diego County, CA	*1,174,866*	*77,541 (6.6%)*

N/A= Data unavailable.
Source: California Department of Finance 2013b

Short-Term Temporary Housing

It is assumed that utility-scale renewable energy project construction workers will affect both long- and short-term housing demand within the DRECP area (III.23.2.1). Table III.23-2 shows all housing, including owner-occupied and rental units. Based on the physical distribution of population centers within the DRECP area, the primary focuses of housing demand are Riverside, San Bernardino, and Imperial counties. This determination is because these counties contain most of the DRECP area, are in areas with high solar potential, and workers seeking temporary housing would be close enough to work on local renewable energy projects. A significant percentage of these three counties also contain

BLM-administered lands. Given the size of the DRECP boundary and these three key counties, it is assumed that a high number of short-term temporary housing units (hotels, motels, and recreational vehicle parks) occur under existing conditions. Due to the commercial nature of this type of short-term temporary housing and the overall size of the DRECP area, accurate data regarding the total number of hotel/motel rooms and RV spaces are not available.

The BLM operates campgrounds throughout the DRECP area. Except for areas with specific camping regulations, vehicle camping is allowed anywhere on BLM-administered land within 300 feet of any posted open route (BLM 2012a). There is a 14-day limit for camping in any one location. After 14 days, campers wishing to stay in the area longer are required to move 25 miles from their original campsite. Long-term camping is available by permit in visitor areas on BLM lands, but because these areas are for recreational use only, workers would not be permitted to live in these areas (BLM 2012a).

III.23.2.4 Employment

Table III.23-3 summarizes years 2008-2018 and 2010-2020 projections of employment by industry type within each Metropolitan Statistical Area (MSA) serving the DRECP area. MSAs are geographic entities defined by the U.S. Office of Management and Budget. Each MSA contains a core urban area of 50,000 or more and comprises one or more counties, including counties containing the core urban area, as well as adjacent counties with a high degree of social and economic integration (as measured by commuting and employment) with the urban core (U.S. Census Bureau 2012a). These areas define both the regional and local study areas for employment. As shown, the study area yields an impressive workforce; a high number of skilled workers are therefore anticipated for renewable energy projects and infrastructure construction and operation.

III.23.2.5 Public Finance

III.23.2.5.1 Bureau of Land Management

In 2012, the BLM's national budget was $1.1 billion, which supported 10,609 full-time equivalent staff. The majority of the BLM budget supports the management of lands and resources. Major funding sources come from oil and gas permit processing funds, recreation fees, and miscellaneous permanent payments. The BLM is one of a handful of agencies that raises more than four times its operating budget in outside fees. With a budget of $1.1 billion, BLM-managed public lands generated nearly $5.7 billion in 2012.

Table III.23-3
Employment Profile of DRECP Regional Study Areas

Regional Study Area	Year 2008 or 2010: Total Workforce	Year 2008 or 2010: Construction Occupations	Year 2008 or 2010: Electrical Infrastructure Operations	Year 2018 or 2020: Projections Total Workforce	Year 2018 or 2020: Projections Construction Occupations	Year 2018 or 2020: Electrical Infrastructure Operations	Year 2013: Unemployment by County (%)
Imperial County, CA (El Centro MSA): 2008-2018	64,900	2,350	600	70,500	2,640	630	24.2
Inyo County, CA (Eastern Sierra MSA): 2008-2018	17,310	1,220	100	18,690	1,240	110	7.5
Kern County, CA (Bakersfield MSA): 2010-2020	299,600	26,340	2,020	355,300	32,920	2,310	12.1
Los Angeles County, CA (Los Angeles MSA): 2010-2020	4,246,700	196,480	8,780	4,904,300	225,140	9,110	9.3
Riverside and San Bernardino counties, CA (Riverside–San Bernardino–Ontario MSA): 2010-2020	1,253,300	80,470	2,210	1,460,000	88,280	2,400	9.6 (Riverside) 9.6 (San Bernardino)
San Diego County, CA (San Diego–Carlsbad–San Marcos MSA): 2010-2020	1,360,100	102,420	2,160	1,619,900	123,700	2,460	7.0
Clark County, NV (Las Vegas MSA): 2010-2020	842,544	54,678	3,775	938,273	63,807	4,211	9.6

Table III.23-3
Employment Profile of DRECP Regional Study Areas

Regional Study Area	Year 2008 or 2010: Total Workforce	Year 2008 or 2010: Construction Occupations	Year 2008 or 2010: Electrical Infrastructure Operations	Year 2018 or 2020: Projections Total Workforce	Year 2018 or 2020: Projections Construction Occupations	Year 2018 or 2020: Electrical Infrastructure Operations	Year 2013: Unemployment by County (%)
La Paz County, AZ (Lake Havasu–Kingman MSA): 2010	44,050	2,240	90	N/A	N/A	N/A	9.5
Yuma County, AZ (Yuma MSA): 2010	55,720	4,440	130	N/A	N/A	N/A	29.3

Notes: MSA = Metropolitan Statistical Area
Includes those identified in the Construction Management, Architecture and Engineering, and the Construction and Extraction trades.
Includes those identified in the Plant System Operators, Power Distributors and Dispatchers, Power Plant Operators, and Plant and System Operators trades.
Source: California Economic Development Department 2013a and 2013b; Nevada Department of Employment, Training, and Rehabilitation (NDETR) 2013a and 2013b; Arizona Department of Administration ADAO 2013a and 2013b.

A portion of BLM's 2012 budget was the New Energy Frontier Initiative. As part of this initiative, BLM promotes and facilitates the development of renewable energy facilities on public lands. The 2012 budget for renewable energy included an increase of $3 million, intended to focus on the environmental elements of renewable energy project proposals. The 2012 budget also maintained BLM's capacity to manage conventional energy development on public lands, but reflects evolving changes in the sources of funding for BLM's energy programs (BLM 2012b).

The abundance of natural resources on BLM-administered public lands throughout California supports families, local communities, and economies. Traditional uses of these public lands, including mining, grazing, and timber harvesting, now blend with activities such as outdoor recreation and energy production. In fiscal year 2012, recreation and other activities on BLM-administered public lands contributed more than $2.5 billion to local and state economies and supported more than 9,600 California jobs (BLM 2013). While fiscal data is not available for the DRECP area only, specific highlights of BLM's recent economic contributions within California include (BLM 2013):

- **Solar Energy:** Processing 22 applications encompassing 309,000 acres; 3 authorized solar facilities in construction, totaling 1,170 megawatts (MW) of production; 1,700 additional MW authorized in three projects; potential to collect $23 million in annual rent during production. These include the Desert Sunlight Solar Farm, Genesis NextEra, and Ivanpah Solar Generating Station projects, identified in Appendix O as environmental baseline.
- **Wind Energy:** 1,373 turbines authorized, producing 828 MW in 27 rights-of-way on 28,800 acres (capable of producing more than $1.8 million in annual rent), and processing 9 development applications on 58,200 acres. This includes the Alta East Wind project, identified in Appendix O as environmental baseline.
- **Geothermal:** 420 MW; 3.1 billion kilowatt/hours of electricity; six producing fields; 99 leases; 31 power plants; $8.4 million in royalties.
- **Biomass:** Western juniper initiative underway, approximately 45,000 tons of biomass offered annually.
- **Right-of-Way (ROW):** Approximately 12,000 linear miles of ROW, including 2,227 road authorizations and 2,054 authorizations for power and telephone lines.
- **Payments in Lieu of Taxes:** The BLM distributed $40.3 million of "payments in lieu of taxes" to compensate California counties and local governments for nontaxable federal lands in their jurisdictions.

III.23.2.5.2 Local Government Services

Table III.23-4 summarizes fiscal year 2011–2012 municipal budgets (most current available data) for each of the seven counties within the DRECP area. It also itemizes revenue and allocation sources of interest to socioeconomic stimuli (where available). The purpose of this baseline data is to establish the revenue and expenditure base of these communities. Environmental baseline and analysis specific to public service levels (fire, police, schools, parks, etc.) are not part of the socioeconomic analysis. Refer to the public services (Chapter III.22) and recreational analyses (Chapter III.18) within this EIS for those particular topics. For a discussion of potential impacts to roadway capacity and service, see Chapter III.19, Transportation and Public Access.

Table III.23-4
Fiscal Year 2011–2012 Municipal Budgets for Local Governments Within the DRECP Area

Area	Total Revenue	Total Expenditures
Imperial County, CA	$480,310,614 (8.1% from Taxes) (<1% from Licenses & Permits)	$480,310,614
Inyo County, CA	$70,344,227 (32.6% from Taxes) (<1% from Licenses & Permits)	$77,865,291 (2.1% Education and Parks)
Kern County, CA	$1,641,443,794 (23.2% from Taxes) (1.1% from Licenses & Permits)	$1,641,443,794 (4.9% Public Ways & Facilities) (0.8% Recreation and Cultural) (0.5% Education)
Los Angeles County, CA	$23,300,000,000 (20% from Taxes)	$23,300,000,000 (1.4% Recreation and Cultural)
Riverside County, CA	$4,397,700,000 (10.4% from Taxes) (<1% Licenses & Permits)	$4,783,900,000 (<1% Parks and Open Space)
San Bernardino County, CA	$3,314,395,474 (17.3% from taxes)	$3,982,031,175
San Diego County, CA	$4,086,000,000 (19.3% from Taxes)	$4,086,000,000 (8.6% Land Use and Environment)

III.23.3 Community and Social Organization

III.23.3.1 Study Area

Based on guidance from Appendix D of the BLM Land Use Planning Handbook, the study area for this specific discussion (within the DRECP area) should include gateway communities, natural resource-dependent communities, and wild land–urban interfaces. Given the programmatic nature of this EIS, these localized community discussions do not apply to this socioeconomic analysis because of their site-specific nature. These localized community analyses will be appropriately conducted in supplemental project-specific NEPA documents for renewable energy projects within the DRECP area where BLM is the federal lead agency (see Chapter IV, Section IV.23.1.1.3, Future Project-Specific Analyses, for more information).

A discussion of Native American populations and lands appears elsewhere in this volume; including environmental justice concerns as they specifically relate to Native American populations (see Chapter III.9, Native American Interests). The following section complies with the applicable component of the BLM Land Use Planning Handbook Appendix D requirements in determining social values and community attitudes toward renewable energy development (for the entire DRECP boundary).

III.23.3.2 Social Values and Community Attitudes Toward Renewable Energy Development

In 2002, California established the Renewable Portfolio Standard (RPS) with the goal of increasing the percentage of renewable energy in the state's electricity mix to 20% of retail sales by 2017. The current RPS applies to all electricity retailers in the state including publicly owned utilities, investor-owned utilities, electricity service providers, and community choice aggregators. All of these entities must adopt these RPS goals of 20% of retail sales from renewables by the end of 2013, 25% by the end of 2016, and 33% by the end of 2020.

RPS goals and mandates were developed at the state level, and an interpretation of public values and attitudes toward renewable energy development only within the DRECP area would be speculative. However, it can be assumed that California communities (including those within the DRECP area) understand that adherence to this regulation requires the use of natural resources and public lands for renewable energy project development needed to achieve these goals. Therefore, in an effort to categorize the social values and attitudes toward renewable energy development, this Proposed LUPA considers public comment and participation throughout the

environmental reviews of baseline renewable energy projects (refer to Appendix O) and the DRECP LUPA environmental review and planning process.

During environmental review and throughout individual renewable energy project approvals, BLM solicited and received public perception and input regarding renewable energy project development within the DRECP area. The environmental baseline includes more than 50 renewable energy projects within the DRECP boundary (Appendix O). As shown in Appendix O, Table 2, larger renewable energy projects generating more than 200 MW have the greatest potential to generate social change within the communities serving them. This is due to the large workforce necessary to construct and support the ongoing operation of these larger renewable energy installations.

The majority of baseline projects are located within Riverside, San Bernardino, and Imperial counties (see Appendix O, Table 2). Therefore, these baseline projects have likely already influenced residents' perception and social attitudes toward renewable energy project development within those regional study areas. The influence of these baseline projects is included within each project's scoping comments and public participation during environmental review. It should be noted that Appendix O does not include all small renewable projects within the DRECP area. Therefore, public opinion of the projects included in Appendix O does not necessarily reflect what may occur. However, these projects and DRECP scoping comments represent the best available information regarding community attitudes toward renewable energy development within the DRECP area.

Community values and attitudes have helped shape key Renewable Energy Action Team (REAT) documents guiding renewable energy development. As part of the REAT, BLM participated in the development of the DRECP area, the Best Management Practices and Guidance Manual for Desert Renewable Energy Projects, and public scoping for this EIS. All of these activities relate to renewable energy project development within the DRECP area. The REAT encouraged public input on the proposed scope of environmental review for the DRECP. Multiple scoping meetings have been conducted throughout the state during preparation of this Final EIS. This chapter has considered all public comments and input received to date that relate to the Proposed LUPA.

III.23.4 Environmental Justice Conditions

III.23.4.1 Defining Environmental Justice Populations

The CEQ Environmental Justice Guidance defines "minorities" as individuals who are members of the following population groups: American Indian or Alaskan Native, Asian or Pacific Islander, Black not of Hispanic origin, or Hispanic (CEQ 1997). The total minority population has been calculated by subtracting the white alone, not Hispanic or

Latino, population from the total population. Within this analysis, for the regional study area, an environmental justice population of concern is identified when the minority population of the potentially affected area is greater than 50% or the minority population percentage is meaningfully greater than the minority population in the general population or other appropriate unit of geographical analysis. For the local study area, any census tract with a minority population greater than 50% was identified as an environmental justice tract of concern.

The CEQ Environmental Justice Guidance defines "low-income populations" as populations with mean annual incomes below the annual statistical poverty level. For this analysis, low-income population was determined by utilizing the U.S. Census data for persons "below poverty level." The CEQ and EPA guidance do not provide a discrete threshold for determining when a low-income population should be identified for environmental justice. Within this analysis, for the regional study area, an environmental justice population of concern is identified when the percentage of low-income population of the potentially affected area is equal to or greater than the low-income population of the greater geography. For the local study area, if the low-income percentage of a census tract was found equal to or greater than that of the county in which it is located, it has been identified for environmental justice analysis.

III.23.4.2 Regional Study Area Minority and Low-Income Populations

Table III.23-5 identifies the minority and low-income percentages of California and each county that the DRECP area includes. It should be noted that several counties (Los Angeles, San Diego, Kern) are not located entirely within the DRECP boundary. As shown, all counties except Inyo are considered regional environmental justice areas of concern with respect to minority population. All counties except Inyo and San Diego are considered regional environmental justice areas of concern with respect to low-income population.

Table III.23-5
U.S. Census 2008-2012 ACS
Environmental Justice Demographics for California and Regional Study Areas

Area	Total Population	Minority Population (Percent of Total)	Percent of Total Population Low-Income
California	*37,325,068*	*22,347,558 (59.9%)*	*15.3%*
Imperial County, CA	173,487	149,611 (86.2%)	23.0%
Inyo County, CA	18,474	6,727 (33.9%)	11.3%
Kern County, CA	839,153	515,581 (61.4%)	22.5%
Los Angeles County, CA	9,840,024	7,108,419 (72.2%)	17.1%

Table III.23-5
U.S. Census 2008-2012 ACS
Environmental Justice Demographics for California and Regional Study Areas

Area	Total Population	Minority Population (Percent of Total)	Percent of Total Population Low-Income
Riverside County, CA	2,192,982	1,325,402 (60.4%)	15.6%
San Bernardino County, CA	2,041,029	1,363,925 (66.8%)	17.6%
San Diego County, CA	3,100,500	1,597,865 (51.5%)	13.9%

Because U.S. Census 2008-2012 American Community Survey (ACS) estimates come from a sample population, a certain level of variability is associated with the estimates. Supporting documentation on ACS data accuracy and statistical testing can be found on the ACS website in the Data and Documentation section available at http://www.census.gov/acs/www/data_documentation/documentation_main/. For purposes of this analysis, U.S. Census ACS data was utilized for providing current data, consistency between the data used to identify minority and low-income populations, and consistency between the different geographies presented. For these reasons, U.S. Census ACS data is considered best available for representing the demographic makeup of communities for this programmatic EIS. Use of published U.S. Census ACS data estimates is commonly used by Lead Agencies in compliance with Executive Order 12898, California Government Code Section 65040.12 and Public Resources Code Section 72000, as well as CEQ and EPA guidance for incorporating Environmental Justice Concerns under NEPA.
Represents the population excluding those identified as "Not Hispanic or Latino, White Alone" within the U.S. Census 2008-2012 ACS data set.
Represents individuals with mean annual incomes below the annual statistical poverty level, identified by poverty status in the last 12 months, identified as "percent below poverty level" within the U.S. Census 2008-2012 ACS data set.
Source: U.S. Census Bureau 2014a and 2014b, as queried through ArcGIS Online to determine Census tracts containing the DRECP.

III.23.4.3 Local Study Area Minority and Low-Income Populations

Appendix R1.23, Table R1.23-1, presents the population of each U.S. Census tract (by county) and the percentage of minority or low-income population within the DRECP area. When considering environmental justice population on a programmatic level, the defined study area includes minority and low-income populations of U.S. Census tracts contained within DRECP boundary.

As described earlier, (see Section III.23.4.1 and Table R1.23-1), a minority census tract of concern was identified when the minority population of the census tract was found to be greater than 50%. Low-income populations of concern are identified when the percentage of low-income population of the census tract is equal to or greater than the percent low-income of the county in which it is located. In Table R1.23-1, tracts of concern are shaded, with their locations shown in Appendix R1, Figures R1.23-1 and R1.23-2.

The following summarizes the number of identified environmental justice tracts of concern by county:

- **Imperial County:** Contains 25 minority tracts of concern and 13 low-income tracts of concern.

- **Inyo County:** Contains no minority tracts of concern and no low-income tracts of concern.
- **Kern County:** Contains 4 minority tracts of concern and 7 low-income tracts of concern.
- **Los Angeles County:** Contains 58 minority tracts of concern and 42 low-income tracts of concern.
- **Riverside County:** Contains 8 minority tracts of concern and 7 low-income tracts of concern.
- **San Bernardino County:** Contains 41 minority tracts of concern and 49 low-income tracts of concern.
- **San Diego County:** Contains no minority tracts of concern and 2 low-income tracts of concern.

III.23.5 Socioeconomics and Environmental Justice by Ecoregion Subarea

This section identifies communities of interest within the DRECP area by ecoregion subareas for socioeconomics and environmental justice. Also refer to these tables for details on each ecoregion subarea: For countywide and local study area populations and housing data, see Tables III.23-1 and III.23-2. For employment profile and local government economic profile data for the counties within each ecoregion subarea, see Tables III.23-3 and III.23-4. For environmental justice demographic data for the Census tracts containing each ecoregion subarea, see Table R1.23-1 (and corresponding Figures R1.23-1 and R1.23-2) in Appendix R1.23.

III.23.5.1 Cadiz Valley and Chocolate Mountains Ecoregion Subarea

The majority of the Cadiz Valley and Chocolate Mountains ecoregion subarea is within Eastern Riverside County. The northern portion of this ecoregion subarea is within San Bernardino County, and the southern portion is within Eastern Imperial County. Blythe, in Riverside County, is the only local study area community that is entirely within the Cadiz Valley and Chocolate Mountains ecoregion subarea. No local study area communities within San Bernardino or Imperial counties are located within this ecoregion subarea.

III.23.5.2 Imperial Borrego Valley Ecoregion Subarea

The majority of the Imperial Borrego Valley ecoregion subarea is within Imperial County, and a small portion of its western boundary is within San Diego County. The following Imperial County local study area communities are entirely within this ecoregion subarea:

- Brawley

- Calexico
- El Centro
- Imperial

No local study area communities within San Diego County are located within the Imperial Borrego Valley ecoregion subarea.

III.23.5.3 Kingston and Funeral Mountains Ecoregion Subarea

The northern portion of the Kingston and Funeral Mountains ecoregion subarea is within Inyo County, and the southern portion is within San Bernardino County. No local study areas are located within this ecoregion subarea.

III.23.5.4 Mojave and Silurian Valley Ecoregion Subarea

The Mojave and Silurian Valley ecoregion subarea is almost entirely within San Bernardino County, except for a small portion of its western boundary within Kern County. No local study areas are located here.

III.23.5.5 Owens River Valley Ecoregion Subarea

The Owens River Valley ecoregion subarea is entirely within the western side of Inyo County. Local study areas within this subarea are smaller rural communities. The portion of the Owens River Valley ecoregion subarea within the BLM Bishop Field Office boundary is economically important; its local economy is geared to tourism and the film industry. The BLM Bishop Field Office issues dozens of annual permits for commercial still and motion photography, ranging from advertisements to major motion pictures in the Alabama Hills. Revenue from these permits and localized spending from production crews and materials help shape the socioeconomic profile of this particular portion of the ecoregion subarea. Please note tourism and filming is important to all of Inyo County and not just the Alabama Hills. The ability to use public lands in the county in the way they have been for generations is also an important factor in the socioeconomic profile of Inyo County.

III.23.5.6 Panamint Death Valley Ecoregion Subarea

The northern portion of the Panamint Death Valley ecoregion subarea is within Inyo County, and the southern portion is within San Bernardino County. A small portion of the southwestern boundary is within Kern County. Local study areas within this ecoregion subarea are smaller rural communities.

III.23.5.7 Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea

The majority of the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea is within San Bernardino County, with a portion of the south end within Riverside County. The following San Bernardino County local study area communities are located entirely within this ecoregion subarea:

- Apple Valley
- Twentynine Palms
- Yucca Valley

No local study area communities within Riverside County are located within the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea.

III.23.5.8 Piute Valley and Sacramento Mountains Ecoregion Subarea

The Piute Valley and Sacramento Mountains ecoregion subarea is entirely within the southeastern area of San Bernardino County. Local study areas within this ecoregion subarea are smaller rural communities.

III.23.5.9 Providence and Bullion Mountains Ecoregion Subarea

The Providence and Bullion mountains ecoregion subarea is entirely within San Bernardino County. Local study areas within this ecoregion subarea are smaller rural communities.

III.23.5.10 West Mojave and Eastern Slopes Ecoregion Subarea

The West Mojave and Eastern Slopes ecoregion subarea is within Kern, Los Angeles, and San Bernardino counties, with a small portion located in Inyo County. This ecoregion subarea is the most urban of all the DRECP ecoregion subareas and it contains the following local study area communities:

- Kern County
- California City
- Ridgecrest
- Tehachapi
- Los Angeles County
- Lancaster
- Palmdale
- San Bernardino County
- Adelanto
- Barstow
- Hesperia
- Victorville

III.23.6 Socioeconomics and Environmental Justice Outside the DRECP Area

This EIS considers the potential impacts of transmission lines that may be required outside of the LUPA Decision Area to carry power generated by renewable energy facilities to urban centers in the western portion of the state. Because of the regional nature of socioeconomics and environmental justice issues, the regulatory (Section III.23.1), employment (Section III.23.2.4), public finance (Section III.23.2.5), and community and social organization (Section III.23.3) environmental settings also apply to transmission corridors, described below.

The following describes the population, housing, and environmental justice for each of the transmission corridor areas: San Diego, Los Angeles, North Palm Springs–Riverside, and Central Valley. The transmission corridors extend outside both the LUPA Decision Area and DRECP boundaries. Consistent with the socioeconomics and environmental justice environmental setting presented for the DRECP area, the following data include only the counties traversed by corridors and the largest city within each county outside the DRECP area.

Table III.23-6 summarizes the current and forecasted population of the corridors outside the DRECP area. Table III.23-7 summarizes the existing housing profile and availability in each area. Finally, Table III.23-8 identifies the minority and low-income percentage of the population for each community traversed by the transmission corridor.

III.23.6.1 San Diego Area

The San Diego corridor boundary roughly follows the existing Sunrise Powerlink corridor. The line would exit the DRECP boundary in the Jacumba area, head northwest through the McCain Valley, head southwest then south through the Cleveland National Forest, then head west then northwest through Alpine and the urban and suburban areas of Santee, El Cajon, and San Diego.

III.23.6.2 Los Angeles Area

Corridors in this area follow the 500 kV Segment 11 of the Tehachapi Renewable Transmission Project (TRTP) for approximately 37 miles from the Vincent Substation to the Mesa Substation, and an existing 220 kV line south from the Mesa Substation near the city of Montebello to Lighthipe Substation near the city of Paramount for about 12 miles. One upgraded 320 kV DC line would extend from Station 7 to Station B/Station 8 located near the city of South Gate in the Los Angeles area. No socioeconomic or environmental justice data are presented for the portion of the Los Angeles area corridors traversing Angeles National Forest, as these areas have very little population and federal and state demographic data for these lands are not available.

III.23.6.3 North Palm Springs–Riverside Area

Corridors in the North Palm Springs–Riverside area include multiple 500 kV transmission lines, which primarily follow the existing Devers transmission corridor. This corridor is located within both Riverside and San Bernardino counties.

III.23.6.4 Central Valley Area

In the Central Valley area, a 500 kV transmission line would extend from the Whirlwind Substation to the PG&E Midway 500 kV Substation near Buttonwillow, and two 500 kV lines would extend from the PG&E Midway Substation to the Tesla Substation west of the city of Tracy. The latter would follow the Path 15 Transmission Line corridor through Gates and Los Banos. The route is generally 3 to 7 miles west of Interstate 5 from the PG&E Midway Substation near Buttonwillow to the Tesla Substation. This corridor is located primarily within unincorporated areas of Kern, Kings, Fresno, Stanislaus, and San Joaquin counties.

Table III.23-6
Population Profile and Projections for the Areas Outside the DRECP

Area	2013 Population	2020 Projected Population	2030 Projected Population	2040 Projected Population
San Diego Area				
San Diego County	*3,150,178*	*3,333,995*	*3,530,896*	*3,749,240*
San Diego	1,326,238	N/A	N/A	N/A
Los Angeles Area				
Los Angeles County	*9,958,091*	*10,441,441*	*10,950,335*	*11,243,022*
Los Angeles	3,863,839	N/A	N/A	N/A
North Palm Springs–Riverside Area				
Riverside County	*2,555,059*	*2,593,211*	*3,046,064*	*3,462,256*
Riverside	311,955	N/A	N/A	N/A
San Bernardino County	*2,076,274*	*2,273,017*	*2,626,945*	*2,988,648*
San Bernardino	212,639	N/A	N/A	N/A
Central Valley Area				
Kern County	*857,882*	*1,057,440*	*1,341,278*	*1,618,681*
Bakersfield	359,221	N/A	N/A	N/A
Kings County	*152,007*	*176,647*	*205,627*	*235,129*
Hanford	55,479	N/A	N/A	N/A
Fresno County	*952,166*	*1,071,728*	*1,241,773*	*1,397,138*
Fresno	508,453	N/A	N/A	N/A
Stanislaus County	*542,124*	*589,156*	*674,859*	*759,027*

Table III.23-6
Population Profile and Projections for the Areas Outside the DRECP

Area	2013 Population	2020 Projected Population	2030 Projected Population	2040 Projected Population
Modesto	205,987	N/A	N/A	N/A
San Joaquin County	*698,414*	*810,845*	*1,004,147*	*1,213,708*
Stockton	296,344	N/A	N/A	N/A

N/A = Data unavailable.
Source: California Department of Finance 2013a and 2013b

Table III.23-7
Year 2013 Housing Profile of Areas Outside the DRECP

Area	Total Housing Units	Vacant Units (Vacancy Rate)
San Diego Area		
San Diego County	*1,174,866*	*77,541 (6.6%)*
San Diego	519,181	33,228 (6.4%)
Los Angeles Area		
Los Angeles County	*3,463,382*	*204,339 (5.9%)*
Los Angeles	1,425,372	96,925 (6.8%)
North Palm Springs–Riverside Area		
Riverside County	*812,234*	*116,149 (14.3%)*
Riverside	99,152	6,544 (6.6%)
San Bernardino County	*704,540*	*88,068 (12.5%)*
San Bernardino	65,451	6,152 (9.4%)
Central Valley Area		
Kern County, CA	*288,624*	*30,017 (10.4%)*
Bakersfield	123,066	9,722 (7.9%)
Kings County	*44,429*	*2,710 (6.1%)*
Hanford	18,783	1,014 (5.4%)
Fresno County	*320,643*	*26,613 (8.3%)*
Fresno	174,775	13,282 (7.6%)
Stanislaus County	*179,908*	*14,393 (8.0%)*
Modesto	75,601	5,973 (7.9%)
San Joaquin County	*253,906*	*20,312 (8.0%)*
Stockton	100,003	9,100 (9.1%)

N/A = Data unavailable.
Source: California Department of Finance 2013b

Table III.23-8
U.S. Census 2008-2012 ACS
Environmental Justice Demographics of Areas Outside the DRECP

Area	Total Population	Minority Population (Percent of Total)	Percent of Total Population Low-Income
San Diego Area			
San Diego County, CA	*3,100,500*	*1,597,865 (51.5%)*	*13.9%*
San Diego	1,308,619	723,423 (55.3%)	15.5%
Los Angeles Area			
Los Angeles County, CA	*9,840,024*	*7,108,419 (72.2%)*	*17.1%*
Los Angeles	3,804,503	2,713,987 (71.3%)	21.2%
North Palm Springs–Riverside Area			
Riverside County, CA	*2,192,982*	*1,325,402 (60.4%)*	*15.6%*
Riverside	306,128	204,209 (66.7%)	17.5%
San Bernardino County, CA	*2,041,029*	*1,363,925 (66.8%)*	*17.6%*
San Bernardino	210,624	169,486 (80.4%)	30.6%
Central Valley Area			
Kern County, CA	*839,153*	*515,581 (61.4%)*	*22.5%*
Bakersfield	347,091	217,201 (62.6%)	19.3%
Kings County	*151,989*	*98,092 (64.5%)*	*20.7%*
Hanford	53,695	30,844 (57.4%)	18.3%
Fresno County	*930,517*	*626,601 (67.3%)*	*24.8%*
Fresno	495,777	345,488 (69.7%)	27.5%
Stanislaus County	*515,115*	*274,570 (53.3%)*	*19.2%*
Modesto	201,986	104,338 (51.7%)	19.5%
San Joaquin County	*687,036*	*440,185 (64.1%)*	*17.5%*
Stockton	292,692	224,975 (76.9%)	23.3%

Because U.S. Census 2008-2012 American Community Survey (ACS) estimates come from a sample population, a certain level of variability is associated with the estimates. ACS estimate data was utilized for providing current data, consistency among the different geography types presented, and is considered to represent the best available for representing the demographic makeup of these communities for this programmatic EIS. Please note, U.S. Census 5-year ACS data is regularly used by Lead Agencies for decisions under NEPA.

Represents the population excluding those "Not Hispanic or Latino, White Alone."

Represents individuals with mean annual incomes below the annual statistical poverty level, identified by poverty status in the last 12 months, as identified within the U.S. Census 2008-2012 ACS data set as "percent below poverty level."

Source: U.S. Census Bureau 2014a, 2014b

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III.24 DEPARTMENT OF DEFENSE LANDS AND OPERATIONS

This chapter presents the environmental setting and affected environment for the Desert Renewable Energy Conservation Plan (DRECP) Bureau of Land Management (BLM) Land Use Plan Amendment (LUPA) for Department of Defense (DOD) lands, including military bases and operations, airspace operations, and radar facilities. It describes the environmental setting for the entire LUPA Decision Area. While DOD lands are included in the LUPA Decision Area, this chapter is provided for informational and planning purposes to show how the Proposed LUPA may impact DOD lands and operations. Although DOD has no regulatory authority under the Proposed LUPA, they have participated in the DRECP planning process.

III.24.1 Regulatory Setting

III.24.1.1 Federal

III.24.1.1.1 Special Use Airspace

As stated in the Special Use Airspace Code of Federal Regulations (CFR; 14 CFR 73.3), "Special use airspace consists of airspace of defined dimensions identified by an area on the surface of the earth wherein activities must be confined because of their nature, or wherein limitations are imposed upon aircraft operations that are not a part of those activities, or both." Special use airspace is defined as either "prohibited areas" or "restricted areas" and includes prohibited areas, restricted airspace, and military operations areas. Vertical and lateral limits define special use airspace and separate military testing and training activities from other air traffic.

III.24.1.1.2 Construction or Alteration Requiring Notice

Notice to the Federal Aviation Administration is required for any proposed construction or alteration of objects in any of the following categories (14 CFR 77.9):

1. More than 200 feet above ground level at its site.
2. Within 20,000 feet of an airport that has at least one runway longer than 3,200 feet where the proposed object would exceed a slope of 100:1 horizontally from the closest point of the nearest runway.
3. Within 10,000 feet of an airport that does not have a runway greater than 3,200 feet and the proposed object would exceed a 50:1 horizontal slope from the closest point of the nearest runway.
4. Within 50,000 feet of a heliport where the proposed object would exceed a 25:1 horizontal slope from the nearest landing and takeoff area of that heliport.

III.24.1.1.3 Department of Defense—Bureau of Land Management Wind Energy Protocol of 2008

In 2008, DOD and BLM signed the Wind Energy Protocol to improve the communication and coordination process for reviewing proposed wind energy right-of-way applications on BLM-administered public lands. The goal of the protocol is to promote long-term wind energy development on BLM-administered public lands that is compatible with military activities. Specifically, the protocol establishes a process for DOD's review of and comment on proposed wind energy applications on BLM-administered public lands. The protocol also provides a process to develop mitigation measures that minimize impacts on military activities and increase opportunities for wind energy development on high-value wind energy sites on public lands in the western United States.

III.24.1.1.4 California Military Lands Withdrawal and Overflights Act of 1994

The U.S. Congress passed Public Law (PL) 103-433, which is known as the California Military Lands Withdrawal and Overflights Act of 1994. The law is a component of the California Desert Protection Act. The act withdrew from BLM 1,100,000 acres of public lands for Naval Air Weapons Station (NAWS) China Lake, 226,711 acres for the Chocolate Mountain Aerial Gunnery Range (CMAGR), and 46,000 acres for Naval Air Facility (NAF) El Centro. Under the public land laws, these lands were withdrawn from appropriation to the Navy for military purposes for a period of 20 years, or until October 31, 2014. Furthermore, this act authorized the continued use of approximately 45,000 acres of withdrawn land for the El Centro managed ranges until 1997 or until such time as Congress reauthorized to renew the withdrawals for those lands. Subsequently, PL 104-201 passed in 1996 and renewed the El Centro land withdrawals for 25 years (2021). Later, the National Defense Authorization Act for Fiscal Year 2014 extended the current land withdrawal until all transfer actions were complete and reported to Congress.

III.24.1.1.5 Department of Defense Siting Clearinghouse

The DOD Siting Clearinghouse is an organization within the DOD that was established in the summer of 2010 and formally authorized by Congress through Section 358 of PL 111-383 in January 2011. Its purpose is to coordinate the DOD review of applications for projects filed with the Secretary of Transportation (pursuant to 49 United States Code 44718) and referred to DOD by the Department of Transportation (specifically the Federal Aviation Administration).

The Clearinghouse coordinates the efforts of all DOD components (including the Joint Staff, Army, Navy, Air Force, Marines, and other critical offices) in the assessment of project

proposals and the development of official DOD positions on the impacts of those projects on military missions (visit the Clearinghouse website at http://www.acq.osd.mil/dodsc/).

III.24.2 Department of Defense Lands and Operations within the LUPA Decision Area

The LUPA Decision Area contains various military installations, military training routes, military operations areas, and special use airspace. These are listed in Table III.24-1 and described in more detail in the following sections.

Table III.24-1
DOD Land and Airspace Within the LUPA Decision Area

Facility Type	DOD Acres
Cadiz Valley and Chocolate Mountains Ecoregion Subarea	
DOD Installations (Eastern portion of CMAGR)	311,000
Military Training Routes	2,414,000
Military Operations Areas	1,155,000
Special Use Airspace – Restricted	295,000
Imperial Borrego Valley Ecoregion Subarea	
DOD Installations (Western portion of CMAGR)	184,000
Military Training Routes	1,716,000
Military Operations Areas	1,522,000
Special Use Airspace – Restricted	336,000
Kingston and Funeral Mountains Ecoregion Subarea	
DOD Installations	0
Military Training Routes	1,383,000
Military Operations Areas	931,000
Special Use Airspace – Restricted	38,000
Mojave and Silurian Valley Ecoregion Subarea	
DOD Installations (Majority of Fort Irwin Naval Training Center and a portion of NAWS China Lake)	1,154,000
Military Training Routes	1,369,000
Military Operations Areas	622,000
Special Use Airspace – Restricted	1,387,000
Owens River Valley Ecoregion Subarea	
DOD Installations (Small portion of NAWS China Lake)	4,000
Military Training Routes	188,000
Military Operations Areas	420,000
Special Use Airspace – Restricted	423,000

Table III.24-1
DOD Land and Airspace Within the LUPA Decision Area

Facility Type	DOD Acres
Panamint Death Valley Ecoregion Subarea	
DOD Installations (Majority of NAWS China Lake)	242,000
Military Training Routes	831,000
Military Operations Areas	1,947,000
Special Use Airspace – Restricted	2,147,000
Pinto Lucerne Valley and Eastern Slopes Ecoregion Subarea	
DOD Installations (Western portion of Marine Corps Air Ground Combat Center Twentynine Palms)	328,000
Military Training Routes	925,000
Military Operations Areas	28,000
Special Use Airspace – Restricted	350,000
Piute Valley and Sacramento Mountains Ecoregion Subarea	
DOD Installations	0
Military Training Routes	524,000
Military Operations Areas	717,000
Special Use Airspace – Restricted	0
Providence and Bullion Mountains Ecoregion Subarea	
DOD Installations (Eastern portion of Marine Corps Air Ground Combat Center Twentynine Palms)	262,000
Military Training Routes	2,153,000
Military Operations Areas	561,000
Special Use Airspace – Restricted	331,000
West Mojave and Eastern Slopes Ecoregion Subarea	
DOD Installations (Edwards Air Force Base)	544,000
Military Training Routes	1,670,000
Military Operations Areas	1,187,000
Special Use Airspace – Restricted	2,247,000
California Desert Conservation Area Outside the DRECP Boundary	
DOD Installations	0
Military Training Routes	1,594,000
Military Operations Areas	659,000
Special Use Airspace – Restricted	548,000

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total in the table.

III.24.2.1 Military Bases and Operations

Within the LUPA Decision Area, DOD operates 11 areas totaling approximately 3,029,000 acres, or just over 13% of the land. Many of these lands were withdrawn from BLM-administered lands and transferred to DOD. As shown in Figure III.24-1 (DOD Installations in the LUPA Decision Area), there are DOD lands throughout the desert region. The majority of these lands are in the facilities described below, and they span all components of the U.S. Armed Forces.

Military operations throughout the LUPA Decision Area include ground and aerial warfare training and testing. Military personnel are trained to use ground and airborne navigation equipment, including fleet tracking and radar targeting devices.

Past, current, and future Marine Air Ground Task Force training requires the use of off-installation lands to support operating forces training exercises across the Sonoran and Mojave deserts. These exercises are similar to the historical exercises conducted during World War II in the California-Arizona Maneuver Area. These Marine Air Ground Task Force exercises typically focus on command and control of river crossing and long-range tactical movements but with smaller footprints and less intensity than the World War II California-Arizona Maneuver Area exercise. Typical exercises include movements off-installation between Yuma Proving Grounds, CMAGR, Marine Corps Air Ground Combat Center (MCAGCC), and/or Fort Irwin Army National Training Center. Restrictions on military transit or use of off-installation property would have impacts on military training that would need to be evaluated on a project-specific basis.

III.24.2.1.1 Edwards Air Force Base

Edwards Air Force Base (AFB) is an approximately 306,700-acre Air Force-operated facility bordered by Kern, Los Angeles, and San Bernardino counties. Edwards AFB, operational since 1948, provides military aircraft testing and training.

The Air Force Flight Test Center at Edwards AFB conducts research, development, testing, and evaluation of aerospace systems. The facility houses multiple airborne weapons systems and operates 65 linear miles of useable landing area and runway lengths up to 7.5 miles.

The R-2508 Complex provides the airspace areas required for bombing ranges, supersonic corridors, low-altitude high-speed maneuvers, radar intercept areas, and refueling areas for Edwards AFB, Fort Irwin Army National Training Center, and NAWS China Lake.

Edwards AFB is the Air Force's second largest installation and plays a vital role in the Developmental and Operational Test and Evaluation of weapons systems. The mission focus is on advancement through Systems Test and Evaluation, Air and Space Superiority,

Global Precisions Attack, Rapid Global Mobility Personnel Recovery, Global Intelligence, Surveillance and Reconnaissance, and Agile Combat Support. The 412th Test Wing at Edwards AFB uses the R-2508 Complex and other ranges, to accomplish test missions on airframes structures, propulsion, avionics, and electronic warfare to ensure weapons systems will operate correctly the first time and every time in combat situations. Edwards AFB is the home of the Air Force Test Pilot School and hosts a number of tenants including the Air Force Operational Test and Evaluation Center, Air Force Research Lab, and National Aeronautics and Space Administration.

III.24.2.1.2 Marine Corps Air Ground Combat Center at Twentynine Palms

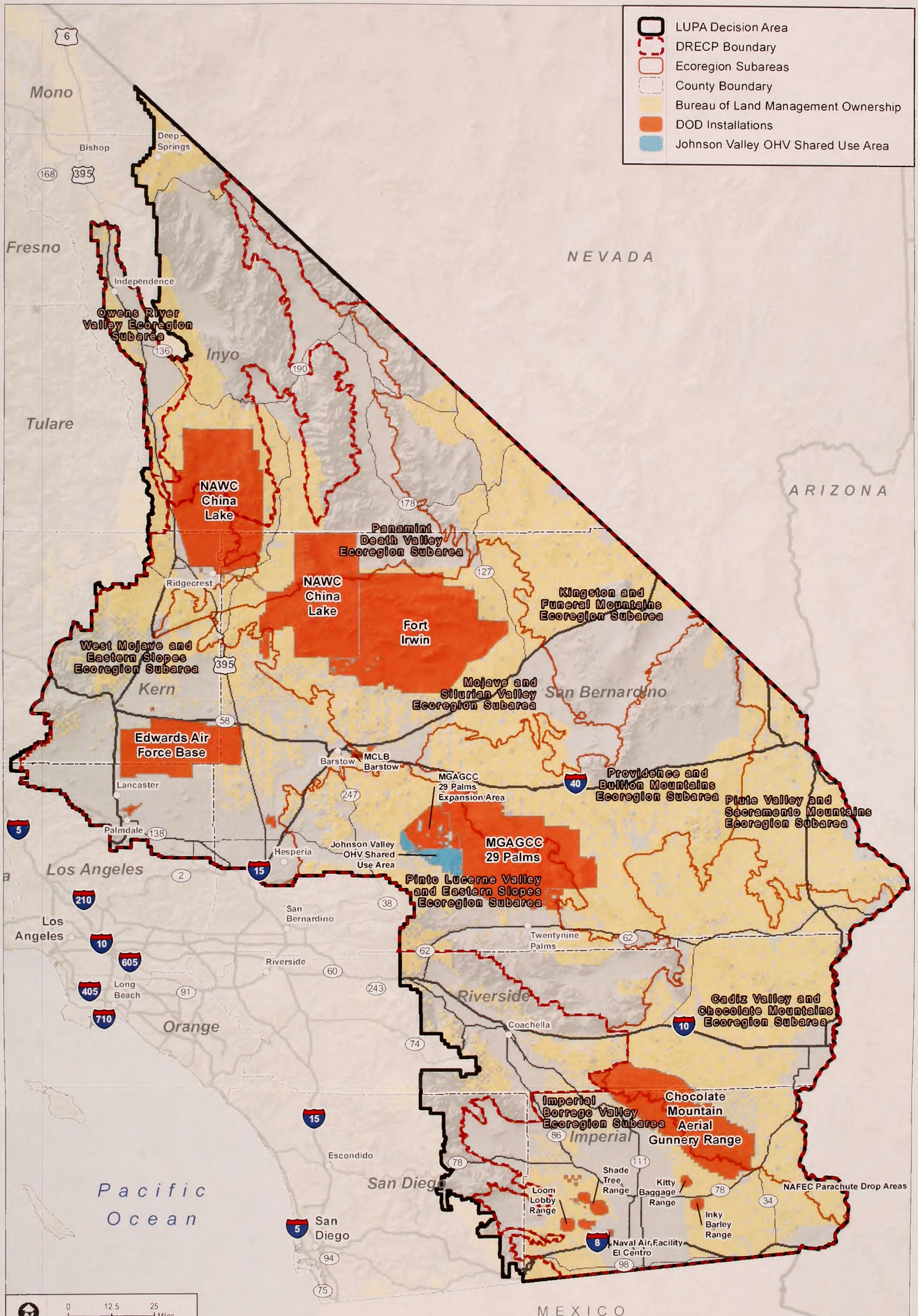
The MCAGCC at Twentynine Palms is an approximately 705,200-acre (1,101 square miles) Marine Corps base adjacent to the city of Twentynine Palms in southern San Bernardino County. Operational since 1952, the MCAGCC is the world's largest U.S. Marine Corps base and the largest military training facility in the nation.

The Record of Decision for Land Acquisition and Airspace Establishment to Support Large-Scale Marine Air Ground Task Force Live-Fire and Maneuver Training at MCAGCC signed in 2013 approved the expansion of the facility to the west and south (see Figure III.24-1). The expansion includes the withdrawal of public land and purchase of private and state-owned land collectively totaling approximately 168,000 acres. Of the 168,000 acres:

- Approximately 103,600 acres (west) are an exclusive military use area.
- 43,000 acres (west) are designated as a Shared Use Area allowing public access when the Marine Corps training exercises are not being conducted (60 days per year for Marine Corps activities and the remaining 305 days for recreational use).
- 21,300 acres (south) are for exclusive military use (see Figure III.24-1).

The Record of Decision also established new Special Use Airspace and modifications to existing airspace, and expanded training operations to include two Marine Expeditionary Brigade Exercises each year to the west and south acquisition areas and the existing Combat Center (DOD 2013).

Training exercises at MCAGCC include every weapons system in the U.S. Marine Corps arsenal, from small arms to attack aircraft. The facility also offers tactical courses for electronic technicians and radio, radar, and air intercept operators.



Sources: ESRI (2014); BLM (2015); RECON (2015)

FIGURE III.24-1

DOD Installations in the LUPA Decision Area

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III.24.2.1.3 Chocolate Mountain Aerial Gunnery Range

The CMAGR is a vital component of the U.S. Marine Corps' largest and most capable aviation training range and managed by Marine Corps Air Station (MCAS) Yuma. The CMAGR portion of that aviation training range complex is on desert mountain terrain (northern area of the Chocolate Mountains) in Riverside and Imperial counties. The Navy operates the facility for aerial bombing and live-fire aerial gunnery practice.

As shown in Figure III.24-2, Chocolate Mountain Aerial Gunnery Range, the land jurisdiction surrounding the CMAGR looks like a checkerboard. The Navy owns roughly half of the CMAGR land; the other half is BLM-administered public land withdrawn from BLM management and reserved by the Navy for military training. Subject to conditions outlined in the California Military Lands Withdrawal and Overflight Act of 1994, the Navy's authority to use the public land in the CMAGR expired in October 2014. In December 2013, the president signed PL 113-66, the National Defense Authorization Act for Fiscal Year 2014. Provisions of this act authorized the transfer of withdrawn public lands in the CMAGR to the Navy. This act also extended the current land withdrawal until all transfer actions were complete and reported to Congress.

CMAGR currently supports military aircrew training in air combat maneuvering and tactics, airborne laser system operations, air-to-air gunnery, air-to-ground bombing, rocketry, and strafing. CMAGR also conducts training in artillery, demolitions, small arms, and Navy Special Warfare.

III.24.2.1.4 Fort Irwin Army National Training Center

Fort Irwin Army National Training Center is an approximately 750,200-acre military training facility in the Mojave Desert of northern San Bernardino County. In 1979, the Department of the Army announced that its National Training Center would be at Fort Irwin. Fort Irwin National Training Center provides both ground and aviation live-fire training.

III.24.2.1.5 Naval Air Weapons Station China Lake

NAWS China Lake is a more than 1.1-million-acre Navy facility. Approximately 781,200 acres are within the LUPA Decision Area boundary. In operation since the 1940s, NAWS China Lake is in the western Mojave Desert approximately 150 miles north of Los Angeles in Kern, Inyo, and San Bernardino counties.

NAWS China Lake researches, develops, acquires, tests, and evaluates weapons systems. Armitage Field contains three runways with more than 26,000 linear feet and 20,500 linear feet of taxiway. More than 20,000 manned and unmanned military sorties are conducted out of Armitage each year.

III.24.2.1.6 Naval Air Facility El Centro

NAF El Centro in Southern California's Imperial Valley is a 2-hour drive from San Diego and Palm Springs and is approximately 15 minutes from the U.S.–Mexico border. Commissioned in 1946, NAF El Centro provides naval ground and aviation training.

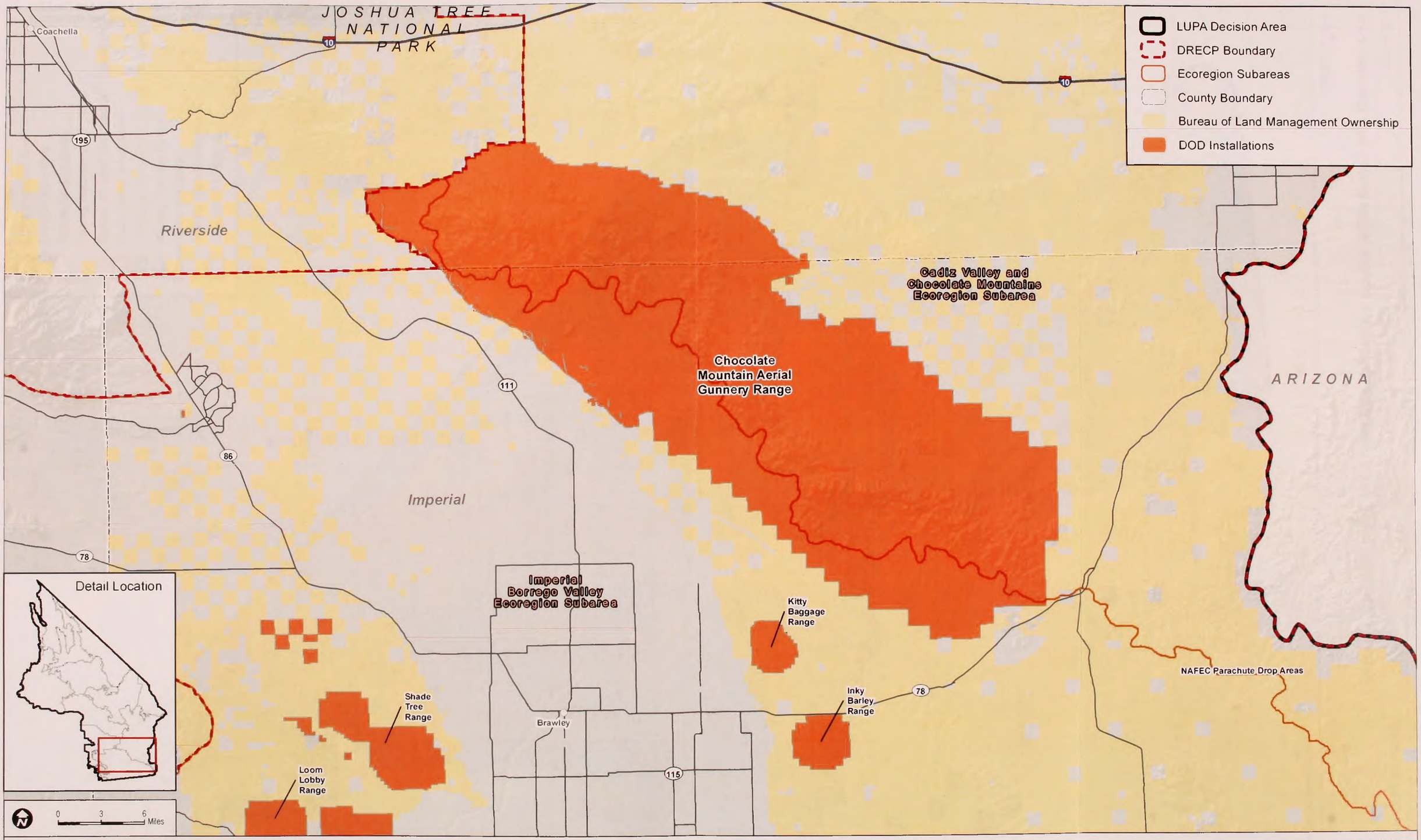
The approximately 2,300-acre base has control over an additional 54,000 acres of ranges and bombing areas in the valley. The range is used for air-to-ground bombing, rocket firing, strafing, dummy drops, and mobile land target training. The facility has two operating runways. The 9,500-foot east–west runway handles 96% of the traffic. It is equipped with special optical landing systems and lighted carrier deck landing areas where pilots can simulate carrier landings.

III.24.2.2 Airspace Operations

The DOD uses military operations areas as designated by the Federal Aviation Administration. Military operations areas are designated to contain nonhazardous, military flight activities in airspace above and between military facilities. There are military operations areas and military training routes throughout the LUPA Decision Area. Military training routes are aerial corridors that serve as flight paths. Military aircraft can operate at floors from surface to 1,000 feet above ground level. Figure III.24-3 shows the location of restricted airspace, military operations areas, and military training routes in the LUPA Decision Area.

The R-2508 Complex is a system of military operations areas and training routes that support military flight crew training, including the airspace used and managed by the three principal military facilities in the upper Mojave Desert region: Edwards AFB, Fort Irwin, and NAWS China Lake (Edwards AFB 2012). The R-2508 Complex provides the largest single area of overland special use airspace in the U.S. and consists of the overlying Restricted Area R-2508, five underlying restricted areas, and 10 military operations areas. Typical operations in the R-2508 Complex include aircraft research and development in all stages of flight, operational weapons test and evaluation flights, student pilot training, air combat maneuvering and proficiency flights, and civilian test aircraft in direct support of DOD and/or defense testing.

The R-2508 Complex encompasses large portions of Inyo, Kern, San Bernardino, and Tulare counties. It also includes a portion of both Fresno and Los Angeles counties and extends into Nevada's Esmeralda County.

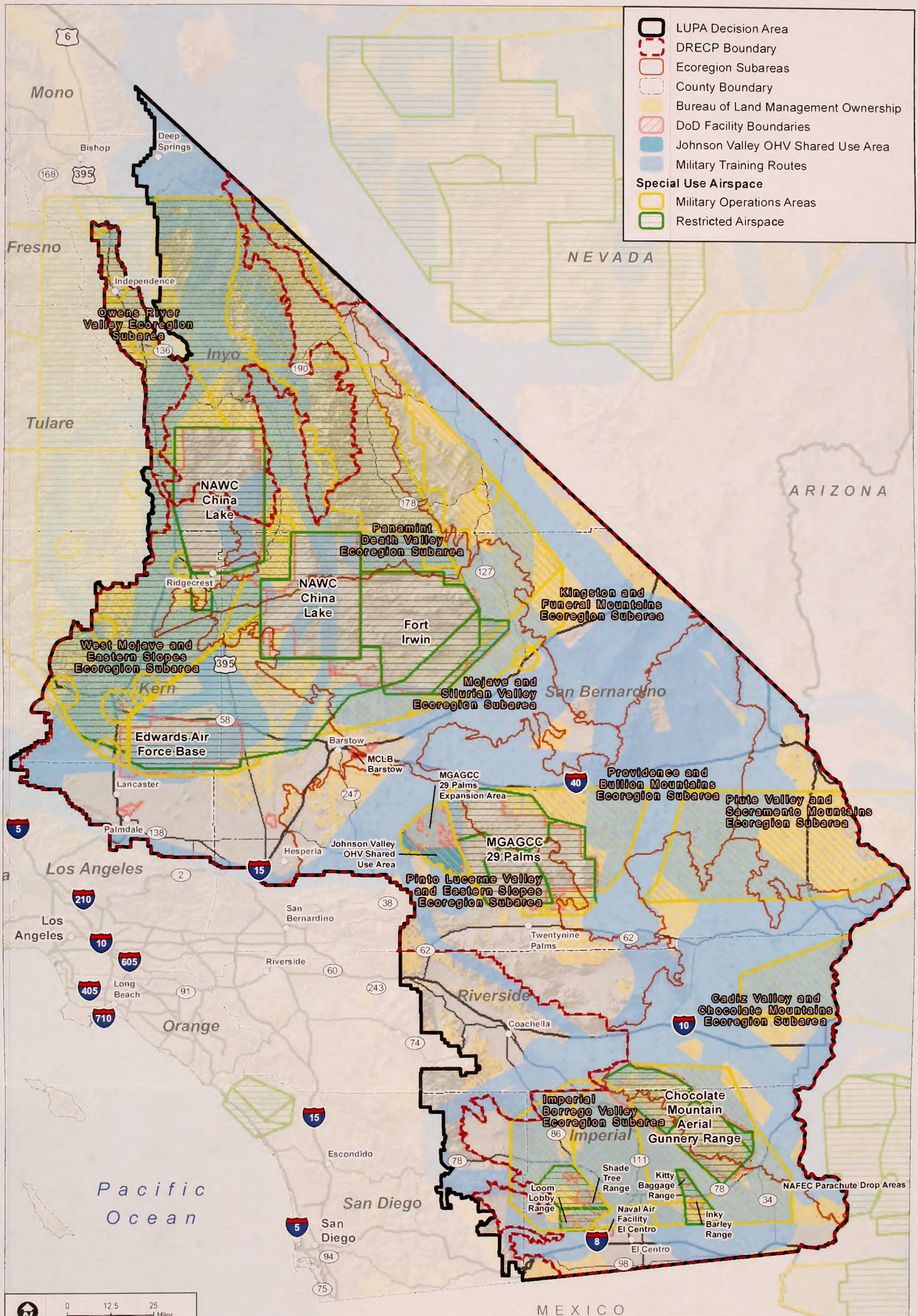


Sources: ESRI (2014); BLM (2015); RECON (2015)

FIGURE III.24-2

Chocolate Mountain Aerial Gunnery Range

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Sources: ESRI (2014); BLM (2015); RECON (2015); NRDC (2011)

FIGURE III.24-3

Military Operations Areas (MOA) and Military Training Routes (MTR) in the LUPA Decision Area

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The Bob Stump Training Range Complex (BSTRC) is the largest single concentration of military restricted airspace with interspersed gunnery and bombing ranges underneath. It provides the U.S. military's premier training venue for realistic tactical air-to-air and air-to-ground aviation training. The BSTRC is situated along the southern U.S. border and spans across southern Arizona and Imperial and Riverside counties in Southern California. It consists of all portions of the R-2301, R-2306, R-2307, R-2308, and R-2311 airspace in Arizona and all portions of the R-2507, R-2512, and R-2510 airspace in California plus all military operations areas and designated bombing/gunnery ranges in and around those established portions of restricted airspace.

Together, the R-2508 Complex and the BSTRC provide DOD with the highest value aviation airspace in the U.S. that replicates the most realistic mission conditions for aircrew proficiency training and unit-level readiness, which include large-scale exercises that integrate air-ground components as well as research, testing, development, and evaluation of aviation and aviation-related systems.

III.24.2.3 Radar Facilities

Radar sites both in and near the LUPA Decision Area are important for military operations. These sites include Terminal Doppler Weather Radar stations, Airport Surveillance Radar installations, and Air Route Surveillance Radar installations (Figure III.24-4). In addition, the military ranges have specialized tracking radar systems, communications systems, and other specialized instrumentation.

III.24.3 Department of Defense Lands and Operations Outside the DRECP Area

III.24.3.1 Department of Defense Lands and Operations—Transmission Outside the DRECP Area

The federal regulatory setting presented in Section III.24.1.1 also covers transmission corridors outside the DRECP area. The affected environment information presented in Section III.24.2.2 for airspace operations additionally covers all transmission outside the DRECP area.

The following discussion provides environmental setting information on DOD lands, military installations, military training routes, military operations areas, and special use air space along transmission corridors outside the DRECP area.

III.24.3.1.1 San Diego Area

DOD installations and facilities near the DRECP area, but outside the boundaries, in the San Diego area include MCAS Miramar, Naval Base San Diego, Naval Base Point Loma, Naval Base Coronado, and Marines Corps Base Camp Pendleton.

- **MCAS Miramar** is home to the 3rd Marine Aircraft Wing, which is the aviation element of the 1st Marine Expeditionary Force. It lies about 10 miles north of downtown San Diego. MCAS Miramar covers approximately 23,000 acres and contains three runways.
- **Naval Base San Diego** is home to the Pacific Fleet, consisting of 49 Navy ships, two Coast Guard cutters, five Military Sealift Command logistical support platforms, and several research and auxiliary vessels. Naval Base San Diego comprises over 1,600 land acres and over 300 acres of water.
- **Naval Base Point Loma,** also in San Diego, provides support to 70 U.S. Pacific Fleet afloat and shore-based tenant commands headquartered on the base.
- **Naval Base Coronado** is a consolidated Navy installation encompassing eight military facilities stretching from San Clemente Island (70 miles west of San Diego) to the La Posta Mountain Warfare Training Facility (60 miles east of San Diego). Naval Base Coronado provides a shore-based platform for helicopters, aircraft carriers, SEAL Teams and other ashore and afloat commands for access to a comprehensive quantity of ground, sea, air, and undersea operational and training space.
- **Marine Corps Base Camp Pendleton** is the Marine Corps' largest West Coast expeditionary training facility. It encompasses more than 125,000 acres in Southern California and is approximately 38 miles from downtown San Diego in North County and 82 miles south of Los Angeles. Camp Pendleton offers a broad spectrum of training facilities for many active and reserve Marine, Army and Navy units, as well as national, state, and local agencies.

III.24.3.1.2 North Palm Springs–Riverside Area

The March Air Reserve Base is a DOD installation and facility near the DRECP area, but outside the boundary. It lies in Riverside County between the cities of Riverside and Moreno Valley and is home to the Air Force Reserve Command's 4th Air Force Headquarters and is host to the 452nd Air Mobility Wing. March Air Reserve Base covers 7,680 acres and contains two runways.

III.24.3.1.3 Central Valley Area

The Lemoore Naval Air Station is a DOD installation and facility near the DRECP area, but outside the boundary. It lies approximately 18 miles east of the DRECP area boundary in the Central Valley.



Sources: ESRI (2014); BLM (2015); RECON (2015); NRDC (2011)

FIGURE III.24-4

Radar Sites in the LUPA Decision Area

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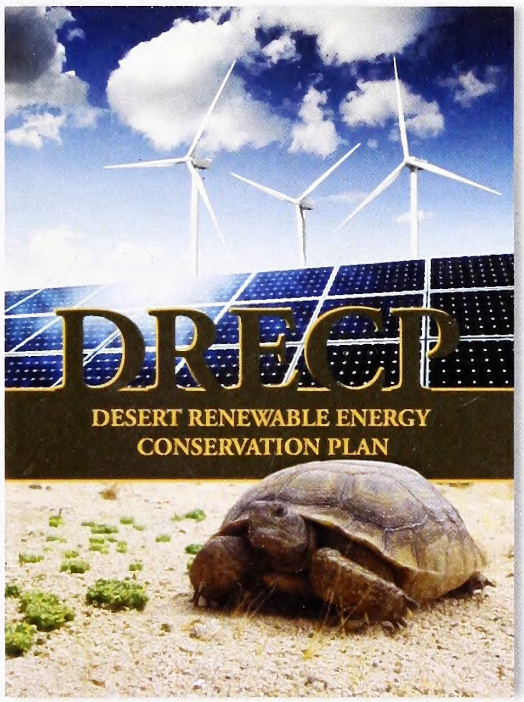
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Desert Renewable Energy Conservation Plan Proposed Land Use Plan Amendment and Final Environmental Impact Statement

Volume IV: Environmental Consequences/Effects Analysis



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California Energy Commission

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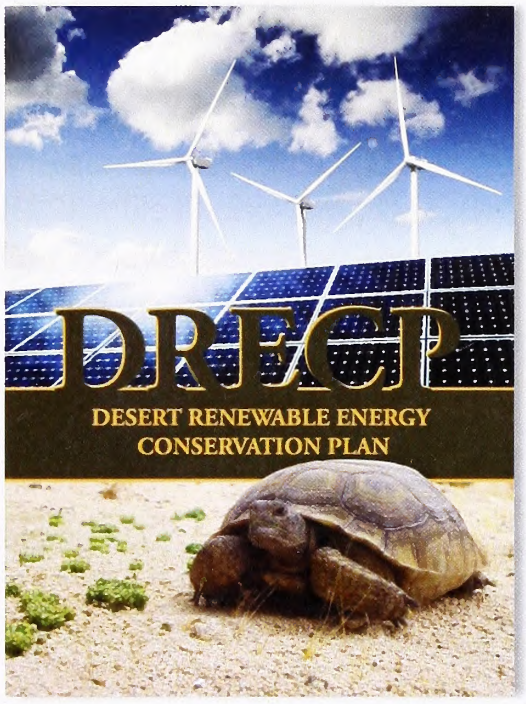
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Part 1 of 2: Chapters IV.1 through IV.6



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ACRONYM LIST

ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
ADA	Available Development Area
AET	actual evapotranspiration
AFY	acre-feet per year
AML	appropriate management level
APCD	Air Pollution Control District
APE	Area of Potential Effects
APP	Avian Protection Plan
AQMD	Air Quality Management District
BBOS	Bird and Bat Operational Strategy
BLM	Bureau of Land Management
BMP	best management practice
CARB	California Air Resources Board
CASGEM	California Statewide Groundwater Elevation Monitoring Program
CBC	California Building Code
CBI	Conservation Biology Institute
CDCA	California Desert Conservation Area
CEC	California Energy Commission
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CHP	California Highway Patrol
CMA	Conservation and Management Action
CMAGR	Chocolate Mountains Aerial Gunnery Range
CMP	Congestion Management Plan
CNDDB	California Natural Diversity Database
CONS	Ecological and Cultural Conservation Area
COS	Condor Operations Strategy
CPUC	California Public Utilities Commission
CRG	Cultural Resources Geodatabase
CRHR	California Register of Historical Resources
CSLC	California State Lands Commission
CWA	Clean Water Act
DFA	Development Focus Area
DOD	Department of Defense
DOI	Department of the Interior
DRECP	Desert Renewable Energy Conservation Plan

DWMA	Desert Wildlife Management Area
DWR	Department of Water Resources
EA	Environmental Assessment
EAFB	Edwards Air Force Base
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERMA	Extensive Recreation Management Area
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FLPMA	Federal Land Policy and Management Act of 1976
FMMP	Farmland Mapping and Monitoring Program
FONSI	Findings of No Significant Impact
FTA	Federal Transit Administration
GFDL	Geophysical Fluid Dynamics Laboratory
GHG	greenhouse gas
GIS	geographic information system
GMDG	ground-mounted distributed generation
GMMP	Groundwater Monitoring and Reporting Plans, and Mitigation Action Plan
HMA	Herd Management Area
HTF	heat transfer fluids
HVH	High/Very High
I-10	Interstate 10
KGRA	Known Geothermal Resource Area
LCRAS	Lower Colorado River Accounting Surface
LLPA	Legislatively and Legally Protected Area
LUPA	Land Use Plan Amendment
LVL	Low/Very Low
LWC	land with wilderness characteristics
MCAGCC	Marine Corps Air-Ground Combat Center
MCAS	Marine Corps Air Station
MEML	Military Expansion Mitigation Land
MET	meteorological
MOA	Memorandum of Agreement
$MTCO_2E$	metric tons carbon dioxide equivalent
MU	Moderate/Unknown
MUC	multiple-use class
MW	megawatt
N/A	not applicable
NAE	Native American Element
NAF	Naval Air Facility

NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NAWS	Naval Air Weapons Station
NECO	Northern and Eastern Colorado Desert Management Plan
NEMA	National Electrical Manufacturers Association
NEMO	Northern and Eastern Mojave Desert Management Plan
NEPA	National Environmental Policy Act
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NHT	National Historic Trail
NLCS	National Landscape Conservation System
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
NSHT	National Scenic and Historic Trail
NWR	National Wildlife Refuge
OHP	Office of Historic Preservation
OHV	off-highway vehicle
OP	Operational
PA	Programmatic Agreement
PCM	Parallel Climate Model
PEIS	Programmatic Environmental Impact Statement
PET	potential evapotranspiration
PFC	proper functioning conditions
PFYC	Potential Fossil Yield Classification
POD	plan of development
PPA	Power Purchase Agreement
PTNCL	Prehistoric Trails Network Cultural Landscape
PV	photovoltaic
RAMP	Recreation Area Management Plan
RCRA	Resource Conservation and Recovery Act
REAT	Renewable Energy Action Team
REMAP	Riverside Extended Mountain Area Plan
RMP	Resource Management Plan
ROD	Record of Decision
ROW	right-of-way
RPS	Renewable Portfolio Standard
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SEGS	Solar Electric Generating System

SEZ	Solar Energy Zone
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SPEIS	Solar Programmatic Environmental Impact Statement
SR-177	State Route 177
SRMA	Special Recreation Management Area
SRP	Special Recreation Permit
SVRA	State Vehicle Recreation Area
TCA	tortoise conservation areas
TCP	Traditional Cultural Properties
TES	thermal energy storage
TMA	Travel Management Area
TTG	Transmission Technical Group
TTMP	Trails and Travel Management Plan
UC	Under Construction
UER	Under Environmental Review
URTD	upper respiratory tract disease
USGS	U.S. Geological Survey
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WEMO	West Mojave
WMRNP	Route Network Project
WSA	wilderness study area

IV.1 INTRODUCTION TO IMPACT ASSESSMENT

This volume analyzes the expected environmental consequences from implementing each alternative described in Volume II, Description of Alternatives. The scope of this impact analysis corresponds to the level of detail provided in the Volume II description of alternatives, and to both the availability and quality of the data used to assess them.

For a summary of the highlighted changes between the Draft EIR/EIS and this Final EIS, see Volume I, Section I.0.4.

A number of appendices provide full technical descriptions of methods and results; both are cited in this volume. Appendix R2 is the primary source of detailed data supporting information in Volume IV. Readers may refer to these appendices for more information about the methods used or other technical details underlying the conclusions and summaries in this volume.

This introductory chapter presents:

- The National Environmental Policy Act (NEPA) requirements guiding impact assessment.
- A summary of the Bureau of Land Management's (BLM) Proposed Land Use Plan Amendment (LUPA), analyzed with respect LUPA to NEPA.
- A summary of the characteristics of the six alternatives (No Action, Preferred Alternative, and Alternatives 1 through 4,) analyzed in each chapter.
- An approach to impact assessment.
- Specific additional NEPA requirements.
- The organization of each analysis section.

IV.1.1 NEPA Requirements Guiding Impact Assessment

The purpose of a Programmatic Environmental Impact Statement (EIS) under NEPA is to consider "broad federal actions such as the adoption of new agency programs or regulations... timed to coincide with meaningful points in agency planning and decision making" (40 Code of Federal Regulations [CFR]1502.4[b]). This programmatic document discusses, on a broad level, the general environmental consequences of the Proposed LUPA and, more specifically, describes regional impacts within the LUPA daDecision Area.

This document broadlydescribes the potential environmental, economic, and social effects of the Proposed LUPA. The discussion of cumulative and growth-inducing impacts is also broad brush and corresponds to the level of analysis of a Programmatic EIS.

The methodology for this assessment also conforms to guidance described in the Council on Environmental Quality (CEQ) regulations for implementing NEPA: methodology and scientific accuracy (40 CFR 1502.24), cumulative impacts (40 CFR 1508.7), and effects (40 CFR 1508.8). Guidance is also found in the BLM NEPA Handbook (H-1790-1).

IV.1.1.1 Impact Assessment

The CEQ NEPA regulations use the terms "effects" and "impacts" interchangeably. The environmental consequences section of an EIS must discuss bothdirect and indirect impacts of a proposed project (40 CFR 1502.16[a]-[b]). Regulations define "effects" as "direct effects, which are caused by the action and occur at the same time and place" (40 CFR 1508.8[a]).

Indirect effects consider effects "later in time or farther removed in distance, but are still reasonably foreseeable" (40 CFR 1508.8[b]). "Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems" (40 CFR 1508.8).

Finally, cumulative impacts must be considered. A "cumulative impact" is an environmental impact created when an individually minor but collectively significant action is added to other past, present, and reasonably foreseeable future actions over time (40 CFR 1508.7). This EIS and Proposed LUPA consider cumulative effects.

Impacts should be addressed in proportion to their significance (40 CFR 1502.2[b]), meaning that severe impacts should be described in more detail than less severe impacts. The intention is to help both decision makers and the public focus on a project's key effects. The NEPA regulations explicitly require discussion of:

- An irreversible or irretrievable commitment of resources (40 CFR 1502.16).
- Tradeoffs between short-term uses of the environment and long-term productivity (40 CFR 1502.16).
- Energy requirements and conservation potential of alternatives (40 CFR 1502.16[e]).

Effects include "ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health [-related impacts], whether direct, indirect, or cumulative." Effects may also be both beneficial and detrimental (40 CFR 1508.8).

IV.1.1.2 Mitigation Measures

This EIS presents no mitigation measures; since LUPA already incorporates nearly 100 pages of comprehensive Conservation and Management Action (CMAs), none are required. (See Section II.3.4.2 in Volume II.) In addition, BLM is committed to implementing appropriate Solar Programmatic EIS (Solar PEIS)design features where appropriate, as well as various other policies, handbooks, and best practices, as described in each chapter of Volume III.

IV.1.2 Summary of Alternatives Analyzed

Each resource chapter in this volume describes the environmentalimpacts of the six DRECP alternatives: the Preferred Alternative, the No Action Alternative, and Alternatives 1 through 4. The description of the No Action Alternative and Alternatives 1 through 4 remain largely unchanged from the Draft EIR/EIS for BLM-managed lands.

IV.1.2.1 Overview of Alternatives Development Process

As described in Volume II, extensive analysis determined the range of DRECP alternatives. The alternatives first consider Development Focus Areas (DFAs) that could accommodate renewable energy generation within low biological resource conflict areas. Each alternative considers different development technologies and locations to analyze a range of potential impacts from renewable energygeneration and transmission. Conservation designations were also developed for each action alternative.

The action alternatives also reflect a range of potential modifications to existing land use plans, and to rules with different approaches to the management of resources on BLM lands: recreational, cultural, scenic, and mineral. Proposed LUPA alternatives must also consider the regional, statewide, and national importance of resource values on BLM lands, as well as analysis in the Solar PEIS for solar development.

The basic components of the alternatives are renewable energy development and conservation designations defined in Volume II for each alternative. Table IV.1-1 shows the basic components in each alternative, including:

1. **Renewable Energy and Transmission Development** – This portion of the table quantifies total DFA acreage on BLM-managed lands. Different mixes of renewable energy technologies were assigned to the alternatives to assess how the proportions of solar, wind, and geothermal projects would likely impact the environment. The ultimate mix will not be determined by the alternatives, but rather by the projects proposed by developers and electricity retailers. Renewable energy development

could still occur outside DFAs, but would require amendments to the applicable land use plan in all allocations except Variance Process Lands.

2. **Conservation Designations** – This portion of the table reports estimated conservation acreages for each alternative in the proposed conservation designations in the Proposed LUPA. Conservation types include National Landscape Conservation System (NLCS) lands, National Scenic and Historic Trails, Areas of Critical Environmental Concern (ACEC), and wildlife allocation lands. Additional designations include Special Recreation Management Areas (SRMAs) and other land use allocations to replace multiple use classes with Visual Resource Management (VRM) classes.

Table IV.1-1 summarizes information about each of the alternatives; the alternatives are described in more detail in Section IV.1.2.2 below. In addition, tables and descriptions with more detailed information about each alternative's components appear in Volume II, Chapters II.2 through II.7.

Table IV.1-1
Summary of Alternative Components

Components on BLM-Managed Lands[1]		No Action	Preferred Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Approximate megawatts		9,792	8,175	3,042	10,726	6,376	7,094
Acres of permanent disturbance[2] long-term disturbance from RE and transmission development		100,000	81,000	52,000	88,000	69,000	71,000
DFA acres		n/a	388,000	81,000	718,000	211,000	258,000
Developable acres[3] (No Action Alternative only)		2,804,000	n/a	n/a	n/a	n/a	n/a
Conservation Designations[4]	In the DRECP area	2,395,000	4,966,000	4,863,000	5,191,000	5,023,000	4,431,000
	In the CDCA outside the DRECP area	79,000	287,000	209,000	428,000	258,000	265,000
SPEIS[5] Solar Energy Zones (SEZ) as DFA		SEZ land is available	Yes, partial	Only a portion	Yes	Only a portion	Yes

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to

the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

[1] BLM-managed lands include approximately 9,784,000 acres within the DRECP boundary and 1,085,000 acres in the CDCA area outside the DRECP boundary.

[2] Ground disturbance impacts associated with siting, construction, and decommissioning; includes solar and ground-mounted distributed generation project area, wind ground disturbance, geothermal project area, and transmission right-of-way area. The geothermal project area impacts reported here include all associated geothermal facilities including the geothermal well field area, as detailed in the description provided in Volume II. Solar, wind, and geothermal impacts are reported for BLM-administered lands only; transmission impacts are reported for BLM and non-BLM lands.

[3] For the No Action Alternative, available development lands are not defined as DFAs.

[4] BLM LUPA conservation designations include proposed NLCS, existing and proposed ACECs, and Wildlife Allocations. There are approximately 3,259,000 acres of BLM-administered lands within existing conservation areas in the DRECP area and 629,000 acres of BLM-administered lands within existing conservation areas in the CDCA outside the DRECP area. BLM LUPA conservation designations that overlap existing conservation areas are not reported here. For the No Action Alternative, the BLM LUPA conservation designation acreage reported is comprised of existing ACECs (non-overlapping acreage) on BLM-administered lands outside of existing conservation areas.

[5] Solar Programmatic Environmental Impact Statement (SPEIS).

In addition to the renewable energy and conservation designations included in each of the alternatives, a transmission scenario was developed for each alternative. (See additional detail in Section IV.1.3.3 and Appendix K from the Draft DRECP and EIR/EIS.)

IV.1.2.1.1 Variance Process Lands

Variance Process Lands are lands that are potentially available for renewable energy development, but it would not be streamlined or incentivized. Variance Process Lands include referred to as Future Assessment Areas and DRECP Variance ProcessLands in the Draft EIR/EIS though these land areas have been revised for the Preferred Alternative based upon comments received on the Draft EIR/EIS, as shown in Table IV.1-2.

Applications for solar, wind, and geothermal projects of any size in Variance Process Lands will follow the variance process described in Volume II, Section II.3.3.3.2. This process includes public outreach, interagency coordination, and consideration of environmental factors before to the NEPA process. On BLM-administered lands, the Variance Process Lands (Future Assessment Areas and DRECP Variance ProcessLands) for Alternatives 1 through 4 are the same as they were in the DRECP Draft EIR/EIS, as shown in Table IV.1-2.

Table IV.1-2
Variance Process Lands Defined by Alternative

Alternative	Location of Variance Process Lands
Preferred Alternative 40,000 acres	• East of California City north of Edward Air Force Base • South of the Interstate 40 near Amboy • North of Interstate 40 west of Needles • North of Blythe, immediately south of the Big Maria Mountains Wilderness Area • North of State Route 178 West of Pahrump • On the edge of the Salton Sea North of Bombay Beach

Table IV.1-2
Variance Process Lands Defined by Alternative

Alternative	Location of Variance Process Lands
Alternative 1 35,000 acres	• East of Highway 395, north of Independence in Inyo County • South of Sandy Valley along the California/Nevada border • West of Needles • Near State Route 62, west of Parker, Arizona, near the California/Arizona border • North of Blythe, immediately south of the Big Maria Mountains Wilderness Area • South of State Route 98, east of Imperial Valley, along the California/Mexico border • Near Hidden Hills • South of Historic Route 66, east of MCAGCC Twentynine Palms, and both east and west of the City of Twentynine Palms • Near the Big Maria Mountain Wilderness Areas
Alternative 2 29,000 acres	• Immediately south of Marine Corps Air-Ground Combat Center (MCAGCC) Twentynine Palms both east and west of the City of Twentynine Palms • North of Victorville
Alternative 3 2,000 acres	• In the Lucerne Valley, both east and west of State Route 247.
Alternative 4 579,000 acres	• East of Highway 395, north of Independence in Inyo County • South of Sandy Valley along the California/Nevada border • West of Needles • Near State Route 62, west of Parker, Arizona, near the California/Arizona border • North of Blythe, immediately south of the Big Maria Mountains Wilderness Area • South of State Route 98, east of Imperial Valley, along the California/Mexico border • North of Hidden Hills along the California/Nevada border • North of the I-15 east of Fort Irwin • Surrounding the Owens Dry Lake • East of California City north of Edward Air Force Base • Surrounding Barstow • Scattered around Adelanto, Victorville, and in Lucerne Valley • East and West of the City of Twentynine Palms • South of the I-40 near Ludlow • South of Historic Route 66 east of MCAGCC Twentynine Palms • North of the Rice Valley Wilderness and Big Maria Mountains Wilderness Area along State Route 62 • South of the I-10 east of the Chuckwalla Mountains Wilderness • South of the I-10, immediately north of the Palo Verde Mountains Wilderness • Scattered west and south of the Chocolate Mountains east of the Imperial Sand Dunes including east of Holtville and south of State Route 98

IV.1.2.2 Key Features of Each Alternative

The following sections identify key features of each alternative analyzed in this volume. Detailed descriptions appear in Volume II, Chapters II.2 through II.7. The environmental

impacts of each alternative are described in furtherdetail in Volume IV chapters. Maps showing the DFAs for each alternative appear in Volume II, Figures II.2-1, II.3-1, II.4-1, II.5-1, II.6-1, and II.7-1.

Volume II describes Proposed LUPA decisions for each alternative. se decisions The will change the management actions and allowable uses of BLM-administered lands both within the CDCA and the Resource Management Plan areas of Bakersfield and Bishop. The Proposed LUPA does not include the Colorado River corridor, which is managed by BLM's Arizona State Office.

The Proposed LUPA alternatives each contain some or all of the following: DFAs, Variance Process Lands, NLCS lands, ACECs, wildlife allocations, SRMAs, and Extensive Recreation Management Areas (ERMAs). They also establish VRM classes and National Trail corridors and close some grazing allotments.

IV.1.2.2.1 No Action Alternative

The No Action Alternative contains about 2.8 million acres of BLM-managed land where renewable energy development is allowed. The remaining approximately 6.6 million acres have some development restrictions.

The most likely locations for futurerenewable energy development, without the Proposed LUPA, would follow permitting patterns established over the past several years.

Characteristics of renewable energy in the No Action Alternative specify that:

- No DFAs would be created. The geographic distribution of renewable energy development would follow past development patterns and technology mixes. The locations of development of renewable energy facilities would likely be less restricted than under any of the action alternatives.
- Current development patterns would continue and likely emphasize:
  - Solar development in the Cadiz Valley and Chocolate Mountains and the Pinto Lucerne Valley and Eastern Slopes ecoregion subareas, in eastern Riverside and southwestern San Bernardino counties, respectively.
  - Wind development in the West Mojave and Eastern Slopes ecoregion subarea, in the Tehachapi Mountains.
  - Geothermal development in the Imperial Borrego Valley ecoregion subarea.
- Solar PEIS variance lands would remain the same as for the Solar PEIS (approximately 577,000 acres). There would be no other Variance Process Lands.

- BLM Conservation Designations would remain the same.
- Conservation policies and practices would continue in the over 3.2 million acres of BLM-administered lands in existing conservation as well as nearly 2.4 million acres of existing ACECs.
- Existing SRMAs would continue on 299,000 acres of BLM managed lands.

IV.1.2.2.2 Preferred Alternative

The Preferred Alternative contains more than 388,000 acres of BLM-managed land designated as DFAs. The characteristics of the Preferred Alternative are that:

- The largest DFAs are located in the Imperial Valley and eastern Riverside County. Smaller DFAs include areas along U.S. Route 395 north of Edwards Air Force Base, west of Naval Air Weapons Station China Lake, and between the China Lake facility and Fort Irwin National Training Center.
- Solar development would likely be concentrated in the Cadiz Valley and Chocolate Mountains ecoregion subarea, with scattered smaller developments in the West Mojave and Eastern Slopes and Pinto Lucerne Valley and Eastern Slopes ecoregion subareas.
- Wind energy projects would likely be located in the West Mojave and Eastern Slopes and Pinto Lucerne Valley and Eastern Slopes ecoregion subareas.
- Geothermal energy projects would likely be developed in the Haiwee Geothermal Leasing Area in the Owens River Valley ecoregion subarea and the Chocolate Mountains area of the Imperial Borrego Valley ecoregion subarea.
- Variance Process Lands are primarily south of Historic Route 66 and east of the Marine Corps Air Ground Combat Center Twentynine Palms and northwest of California City.
- Conservation designations are generally balanced between ACECs and NLCS, with somewhat greater presence on NLCS lands.
- SRMAs would be increased by 2,458,000.
- ERMAs are located in the eastern portion of the DRECP area and cover 946,000 acres.

IV.1.2.2.3 Alternative 1

Alternative 1 has the smallest area of DFAs, with about 81,000 acres of BLM-managed land within DFAs. Its characteristics are that:

- The very limited DFAs are in the Imperial Valley, with small DFA acreage in the Blythe area, Hesperia/Lucerne Valley, and in the Barstow area. There are scattered DFAs in the Tehachapi area, and very small DFAs along the U.S. Route 395 corridor.

- The alternative assumes more solar energy development than either wind or geothermal.
- Solar energy projects would be mostly developed in the Pinto Lucerne Valley and Eastern Slopes and West Mojave and Eastern Slopes ecoregion subareas.
- Wind energy development would most likely be in the West Mojave and Eastern Slopes and Pinto Lucerne Valley and Eastern Slopes ecoregion subareas.
- Geothermal development would most likely be in the Imperial Borrego Valley ecoregion subarea.
- Variance Process Lands include about 35,000 acres.
- Conservation designations mostly include ACECs and wildlife allocations.
- SRMA acreage would increase by approximately 2,537,000.

IV.1.2.2.4 Alternative 2

Alternative 2 has the most DFA acreage, with more than 718, 000 BLM-managed acres within DFAs. Its characteristics are that:

- The DFAs are large and geographically dispersed in the Imperial Valley south of the Chocolate Mountains, eastern Riverside, the Lucerne Valley, Barstow and Tehachapi areas, along the U.S. Route 395 corridor, in the Silurian Valley, and near Hidden Hills.
- More geographically dispersed wind energy projects could be built on both public and private lands.
- There would be greater siting flexibility for renewable energy development.
- Geothermal would likely be developed in the Imperial Borrego Valley and Owens River Valley ecoregion subareas.
- Variance Process Lands include about 29,000 acres.
- BLM LUPA Conservation Designation lands would most likely be on NLCS lands.
- SRMA acreage would increase by approximately 2,463,000.

IV.1.2.2.5 Alternative 3

Alternative 3 contains more than 211,000 acres of DFAs on BLM-managed lands. Its characteristics are that:

- The DFAs are widely scattered in the Imperial Valley, Blythe area, Lucerne Valley, Barstow area, Searles Dry Lake, Haiwee, and in the Tehachapi area.

- Dispersed solar energy projects would be mostly built in the Imperial Borrego Valley, Cadiz Valley and Chocolate Mountains, and West Mojave and Eastern Slopes ecoregion subareas.
- Wind project development would most likely be in the Pinto Lucerne Valley and Eastern Slopes and West Mojave and Eastern Slopes ecoregion subareas.
- Geothermal energy would likely be developed in the Imperial Borrego Valley and Owens River Valley ecoregion subareas.
- Variance Process Lands include about 2,000 acres.
- Conservation Designations include ACECs and NLCS lands with a somewhat greater emphasis on NLCS lands.
- SRMA acreage would increase by approximately 2,531,000.

IV.1.2.2.6 Alternative 4

Alternative 4 has over 258,000 acres of DFAs on BLM-managed lands. Its characteristics are:

- The DFAs are mostly in eastern Riverside County, with smaller areas in the Lucerne Valley, Barstow area, Imperial Valley, and in the Tehachapi area.
- Solar energy development would mostly be in the Cadiz Valley and Chocolate Mountains ecoregion Subarea.
- Dispersed wind energy projects would be primarily in the West Mojave and Eastern Slopes ecoregion Subarea.
- Geothermal development would be mostly in the Imperial Borrego Valley and Owens River Valley ecoregion subareas.
- There are large areas of Variance Process Lands throughout the region totaling nearly 577,000 acres, almost three times the DFA acreage on BLM-managed lands.
- Conservation Designations are balanced between ACECs and NLCS lands.
- SRMA acreage would increase by approximately 2,489,000.

IV.1.3 Approach to Impact Assessment

Each Volume IV chapter considers potential impacts to each resource in each of the following chapter sections:

1. Section IV.1.3.1 describes typical impacts from the construction, operation, and decommissioning of renewable energy and transmission projects within the LUPA Decision Area. Note that similar types of impacts could also result from other types

of activities on BLM-managed lands, which could be permitted by BLM after approval of this Proposed LUPA.

2. Section IV.1.3.2 describes the impacts of Ecological and Cultural Conservation and Recreation Designations in the BLM Proposed LUPA decisions in the Decision Area, both within and outside of the DRECP area.
3. Section IV.1.3.3 describes the required transmission facilities that would be located outside of the DRECP area.

IV.1.3.1 Renewable Energy and Transmission Facilities

This analysis covers theconstruction and operation of renewable energy projects and the transmission lines and substations needed to deliver theirelectricity to load centers via investor-owned electric utility transmission lines. Each alternative analyzed in this document includes both generation and transmission development. Descriptions of how this EIS considers these facilities follow.

IV.1.3.1.1 Effects of Renewable Energy Generation

For each action alternative, renewable energy generation facilities are assumed to be built within DFAs. Three major phases of project construction create the greatest environmental impacts: site characterization, construction and decommissioning, and operations and maintenance. Each chapter addresses the potential environmental impacts of Proposed LUPA decisions on BLM-administered lands within the LUPA Decision Area. CMAs would also apply to approved activities, defined in detail in Volume II, Chapter II.3.

Site Characterization. Before renewable energy project construction begins, many site characterization activities are required. These activities are often completed even before a formal application is submitted to a lead agency since an application must contain detailed information on site resources. Site characterization includes reconnaissance surveys (e.g., biological and cultural resource surveys), geotechnical borings, meteorological station installations, and vehicle use along temporary or permanent access roads.

Construction and Decommissioning. Primary environmental impacts from construction include ground disturbance, vegetation clearing, earth moving, road construction, ground excavation, foundation construction, drilling and blasting, as well as other activities. Decommissioning requires structure removal, which creates similar disturbances as during construction, in addition to noise, dust, and vehicle traffic.

Operation and Maintenance. Some of the activities from operating and maintaining a renewable energy facility include panel washing, road grading, facility inspection, and vehicle use. These activities also cause impacts that may continue over many years. In addition, the

actual operation of renewable energy facilities can affect resources in many ways. For example, birds and bats could be killed or injured if they collide with wind turbine blades or transmission lines or conductors. The glint, glare, and solar flux from the sun, reflecting off solar panels or mirrors, can adversely impact birds, bats, and insects. Large industrial facilities can also impair an area's natural visual beauty for visitors.

IV.1.3.1.2 Effects of Transmission Facilities Within the LUPA Decision Area

Transmission lines and substations would be required to deliver electricity from remote renewable energy facilities to high-demand areas. Transmission facilities include transmission lines of various ratings, substations, access roads, and construction yards. The impacts of transmission facilities would be phased in three stages: site characterization, construction, and operation and maintenance. The analysis in this EIS is based on an estimate of the acres of disturbance required for new transmission, but the specific locations of future transmission lines are not yetknown.

IV.1.3.2 Conservation Designations and Conservation and Management Actions

Volume II identifies and defines proposed conservation designations for each alternative. A map for each alternative shows these areas. Certain CMAs would also apply within the DFAs to avoid, minimize, and mitigate the impacts of renewable energy and transmission development. The CMAs are described in Volume II, Section II.3.4.2. Changes to conservation designations can create a range of adverse environmental impacts. For example, existing conservation management may either protect sensitive soil resources or restrict recreational uses or access to mineral resources. The effects of the conservation designations are analyzed for each alternative in this EIS.

IV.1.3.3 Transmission Outside the DRECP Area

Transmission lines would be required outside of the DRECP area in order to deliver project-generated electricity to high-demand areas via investor-owned electric utilities' transmission lines. Alternative-specific transmission plans are described in text and shown on maps in the Draft DRECP Appendix K (Transmission Technical Group Report). These scenarios are based on the allocation of generation from the projects, shown in Draft EIR/EIS Appendix F. Most transmission corridors are the same for all alternatives, but some alternatives would require an additional transmission line to tie into a nearby electric utility transmission grid.

Each section analyzes these transmission impacts in as much detail as possible given thecurrent information and assumptions of future transmission line locations, which are not yet known.

IV.1.4 Methods and Organization of Impact Analysis

Each Volume IV chapter defines the assessment methods used to evaluate the impacts of project development and conservation designations.

Impacts may also be either short term or long term. For purposes of this analysis, short-term impacts generally occur within 2 years of an action. For example, construction noise impacts would be short term. Loss of vegetation from site construction would be a long-term impact because of the long recovery periods in desert ecosystems. Another example of a long-term impact would be reduction of available groundwater from pumping water to clean panels or mirrors, or to meet other operational needs.

Following are the Volume IV chapter titles.

IV.2 Air Quality

IV.3 Meteorology and Climate Change

IV.4 Geology and Soils

IV.5 Flood Hazard, Hydrology, and Drainage

IV.6 Groundwater, Water Supply, and Water Quality

IV.7 Biological Resources

IV.8 Cultural Resources

IV.9 Native American Interests

IV.10 Paleontological Resources

IV.11 Land Use and Policies

IV.12 Agricultural Land and Production

IV.13 BLM Lands and Realty—Rights-of-Way and Land Tenure

IV.14 BLM Land Designations, Classifications, Allocations, and Lands with Wilderness Characteristics

IV.15 Mineral Resources

IV.16 Livestock Grazing

IV.17 Wild Horses and Burros

IV.18 Outdoor Recreation

IV.19 Transportation and Public Access

IV.20 Visual Resources

IV.21 Noise and Vibration

IV.22 Public Safety and Services

IV.23 Socioeconomics and Environmental Justice

IV.24 Department of Defense Lands and Operations

IV.25 Cumulative Impacts Analysis

IV.26 Other CEQA and NEPA Considerations

IV.27 Comparison of Alternatives

As described in Volume III, Chapter III.1 (Affected Environment), the affected environment is essentially the environmental baseline used to measure environmental impacts from the Proposed LUPA. Impacts are assessed in each alternative by examining resource changes

against the baseline. Chapters IV.2 through IV.23 are resource-specific analyses. Each chapter identifies the impacts for each alternative.

IV.1.4.1 Impact Assessment Methodology

Action Alternatives

This section defines the steps used to assess and evaluate project development impacts within the Proposed LUPA. More specific descriptions of this approach for each resource appear at the beginning of each Volume IV chapter.

Step 1: Geographic Distribution of Impact Acreage

As described in Draft EIR/EIS Appendix F, the acreage impacted by each renewable energy technology was allocated to DFAs based on installedgeneration capacity (megawatts) in each ecoregion subarea. The method used to allocate this capacity is shown in Draft EIR/EIS Appendix F1. Using standard acreage assumptions for each renewabletechnology, ground disturbance was quantified for each technology and alternative, which then became the basis for the impact analyses.

Step 2: Development Restriction Within DFAs

Application of CMAs would preclude or constrain renewable energy development in portions of the DFAs (the CMAs are explained in detail in Volume II, Section II.3.4.2). The DFA area remaining for development after applying the CMAs is the "net available DFA."

Step 3: Distribution of Technologies and Acres of Development

The DFAs for each alternative include substantially more land area than expected to be developed for renewable energy projects on BLM-managed lands under this Proposed LUPA. This larger area allows flexibility in siting projects within DFA boundaries and also allows for the fact that not all land within a DFA is either suitable or available for development. The specific locations of future development within DFAs is not yet known.

In order to determine environmental effects within each DFA, the proportion of ground disturbance was first calculated, followed by calculating each resource's acreage, using the same proportion. The analysis (using Geographic Information Systems [GIS]) then applies this proportional model to define the acres of impacts for each resource. For example, if 5% of the DFAs in an ecoregion subarea would be impacted by solar development, then the analysis assumes that 5% of the resources in that DFA would be impacted by solar development. In this example, if resources exist in only one portion of a DFA, the analysis assumes 5% of the acres of that resource within the DFA would be impacted, not 5% of the

entire DFA. The net result is the truenumber of acres impacted from each technology developed within a DFA. A GIS-based formula ultimately prorates impacted acres within each DFA, based on the technology-specific acreage required to develop that DFA's generation capacity.

Again, the impact estimates for each alternative have different assumptions and depend upon the relative mix of solar, wind, and geothermal projects. However, the selection of one alternative over another is not expected to affect the mix of technologies actually built.

Step 4: Effects of Transmission Facilities

Transmission facilities by their nature are not confined to DFAs, so their environmental . impacts would be both within and outside of DFAs. Within DFAs, transmission would be required because each generation facility needs transmission infrastructure to transport its electricity. Additional transmission facilities would be located both within and outside of DFAs for the transmission lines and substations needed to move electricity from multiple remote sources to populated areas of high electricity demand. The Transmission Technical Group report (see Draft DRECP EIR/EIS Appendix K), defines the estimated acreage needs for transmission and substation facilities within the LUPA Decision Area. This acreage data determines the total impact of generation and transmission.

IV.1.4.2 Impact Reduction Strategies

This EIS considers impact reduction strategies in several ways. First, the Preferred Alternative and Alternatives 1 through 4 have been designed to incorporate CMAs and to conservation designations avoid, minimize and mitigate impacts from renewable energy development. These CMAs and conservation designations are described in Volume II, Chapter II.3, Section II.3.1, Overview of the Preferred Alternative.

The Regulatory Setting for each Volume III chapter discusses existing laws and regulations that apply to renewable energy development. Existing BLM land use plans (e.g., CDCA) and regional plans (e.g., Solar PEIS) apply to all development on BLM-managed lands and contain mandatory provisions to reduce their environmentalimpacts. These existing plans are described in Volume II, Chapter II.2 under the No Action Alternative.

Each chapter in Volume IV summarizes both existing laws and regulations and applicable portions of existing land use plans.

IV.1.4.3 Cumulative Impacts

The cumulative impact assessment presented in Chapter IV.25 analyzes how environmental conditions may be affected by the Proposed LUPA in combination with other likely past, present, and reasonably foreseeable future activities within the LUPA Decision Area.

IV.1.5 Other Required NEPA Considerations

NEPA requires definitions for the specific considerations shown below. Chapter IV.26 analyzes each of these issues.

Relationship of Short-Term Uses of the Environment and Long-Term Productivity. CEQ regulations (40 CFR 1502.16) and the BLM NEPA Handbook (H-1790-1) require discussion of the relationship between short-term uses of the human environment and the maintenance and enhancement of long-term productivity involved in implementing the Preferred Alternative or other alternatives.

Irreversible and Irretrievable Commitment of Resources. CEQ regulations (40 CFR 1502.16) and the BLM NEPA Handbook (H-1790-1) require discussion of any adverse effects that cannot be avoided, and any irreversible and irretrievable commitments of resources if a project is built. An irreversible commitment of resources is made when direct and indirect effects of the activities limit options for future landuse. A resource commitment is considered irretrievable when it is no longer available for future use. Examples of irretrievable commitments include loss of production, harvest, or the use of natural resources.

Energy Requirements and Conservation Potential of Various Alternatives and Mitigation Measures. NEPA requires thatan EIS describe energy requirements and the conservation potential of various alternatives and mitigation measures (40 CFR 1502.16[e]).

Indirect Effects Including Growth-Inducing Effects. NEPA requires an analysis of indirect effects, including growth-inducing effects (1508.8[b]). Indirect effects may include induced changes in land use patterns, population density or growth rate, and otherrelated impacts to air, water, and other natural systems, including ecosystems.

IV.1.6 Organization of Each Analysis Section

Volume IV contains 22 chapters, as listed in Section IV.1.4. Chapters IV.2 through IV.23 are organized as shown below. In addition to the resource-specific impact analyses, Chapter IV.24 describes Department of Defense lands, Chapter IV.25 discusses cumulative impacts, and Chapter IV.26 explores additional NEPA requirements. Chapter IV.27 summarizes and compares the impacts of the five action alternatives evaluated in this volume.

Each Volume IV chapter presents the following topics for each alternative:

- Impacts of Renewable Energy and Transmission
  - Impacts of Variance Process Lands
  - Design Features of the Solar PEIS
  - Conservation and Management Actions
- Impacts of Ecological and Cultural Conservation and Recreation Designations
- Impacts of Transmission Outside the DRECP Area
- Comparison of Preferred Alternative With No Action Alternative
- Comparison of Alternatives 1 through 4 With Preferred Alternative

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IV.2 AIR QUALITY

This chapter analyzes the air quality impacts of the Bureau of Land Management's (BLM) proposed Land Use Plan Amendment (LUPA) for the Desert Renewable Energy Conservation Plan (DRECP). This analysis is at a programmatic level. Areas within each air basin share the same air masses so have similar ambient air qualities. It is important to note, therefore, that in this analysis the air quality within each DRECP ecoregion subarea depends upon the air quality in other air basins. Current air quality conditions for each of the air basins in the LUPA decision area are described in Volume III, Section III.2.4.

The analysis in this chapter focuses on the DRECP area, because the proposed LUPA actions outside of the DRECP area would not include activities or components that require analysis for air quality impacts.

IV.2.1 Approach to Impact Analysis

The DRECP area encompasses approximately 33% of the Great Basin Valleys Air Basin, approximately 94% of the Mojave Desert Air Basin, approximately 70% of the Salton Sea Air Basin, and approximately 10% of the San Diego Air Basin. Table IV.2-1 shows each ecoregion subarea, current conditions in those ecoregion subareas for pollutants of most concern (criteria pollutants), and air quality attainment status for both state and federal standards.

The LUPA alternatives will generate solar, wind, geothermal, and transmission renewable energy development applications within identified Development Focus Areas (DFAs). Each proposed project requires applicable National Environmental Policy Act (NEPA) analysis for that project's environmental impacts. Air emissions from anticipated projects in the DRECP area will continue over the life of the DRECP within all DFAs. Because of the size of the DRECP area and the long-term nature of the proposed LUPA, it is unlikely that the construction and location of projects will overlap.

The comparisons of alternatives are based upon anticipated emissions generated by equipment and vehicle exhaust and dust from ground disturbances caused by the construction, operation and maintenance, and decommissioning of renewable energy and transmission projects in affected air basins.

Table IV.2-1
Federal and State Area Designations for Ecoregion Subareas

Ecoregion Subarea	Federal Area Designations												State Area Designations							
	Ozone						*PM_{10}*				*$PM_{2.5}$*		*Ozone*	*PM_{10}*	*$PM_{2.5}$*			*Hydrogen Sulfide (H_2S)*		
	1997 8-hour Standard			*2008 8-hour Standard*																
	Attainment (maintenance)	*Moderate Nonattainment*	*Severe-15 Nonattainment*	*Unclassified/ Attainment*	*Marginal Nonattainment*	*Severe-15 Nonattainment*	*Unclassified*	*Attainment (maintenance)*	*Moderate Nonattainment*	*Serious Nonattainment*	*Unclassified/ Attainment*	*Nonattainment*	*Nonattainment*	*Nonattainment*	*Unclassified*	*Attainment*	*Nonattainment*	*Unclassified*	*Attainment*	*Nonattainment*
Cadiz Valley and Chocolate Mountains	X	X	X	X	X	X	X		X	X	X		X	X	X			X		
Imperial Borrego Valley	X	X			X					X	X	X	X	X	X		X	X		
Kingston and Funeral Mountains	X		X	X		X	X		X		X		X	X	X	X	X	X	X	
Mojave and Silurian Valley	X	X	X	X	X	X	X		X		X		X	X	X		X	X		X
Owens River Valley	X			X			X	X	X	X	X		X	X		X		X		
Panamint Death Valley	X	X		X	X		X	X	X		X		X	X	X	X		X	X	X
Pinto Lucerne Valley and Eastern Slopes	X		X	X		X	X		X	X	X		X	X	X		X	X		
Piute Valley and Sacramento Mountains	X			X					X		X		X	X	X			X		
Providence and Bullion Mountains	X		X	X		X			X		X		X	X	X		X	X		
West Mojave and Eastern Slopes	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X

All ecoregion subareas (with the exception of the Owens River Valley and the Piute Valley and Sacramento Mountains) are at some level of nonattainment for the federal standard for ozone. All ecoregion subareas are in nonattainment for ozone for the state standard. As shown in Volume III, Figure III.2-6 (Federal PM_{10} Attainment Status), parts of all of the ecoregion subareas are at some level of nonattainment for particulate matter less than 10 micrometers in diameter (PM_{10}) for both federal and state standards. Parts of the DRECP area are in federal nonattainment for the 1997 8-hour ozone, 2008 8-hour ozone, PM_{10}, $PM_{2.5}$, and in state nonattainment for ozone, PM_{10}, $PM_{2.5}$, and H_2S.

Renewable energy facilities and their associated transmission facilities could expose sensitive receptors to substantial concentrations of hazardous or toxic air pollutants, especially from diesel-powered equipment. Geothermal field development can also cause emissions of odorous H_2S.

Renewable energy development could hinder implementation of air quality plans in existing nonattainment areas. The DRECP area contains multiple Air Quality Management Districts (AQMDs) and Air Pollution Control Districts (APCDs) charged with air quality planning. The State Implementation Plan (SIP) is a collection of plans developed by state and local air quality agencies and submitted for Environmental Protection Agency (EPA) approval; these plans detail state strategies for achieving federal air quality standards. As shown in Volume III, Section III.2.1.4, individual AQMDs and APCDs are responsible for preparing and implementing their respective local portions of the SIP; potential conflicts with federal or state standards could exacerbate nonattainment conditions. Chapter IV.25 addresses cumulative emissions issues.

IV.2.2 Typical Impacts Common to All Action Alternatives

This chapter describes typical solar, wind, geothermal, and transmission project impacts on air quality on BLM-managed lands. Primary concerns include fugitive dust emissions from soil or ground disturbances and emissions from equipment and motor vehicle engine exhaust. Determination of allowable locations for renewable energy and transmission projects is driven by LUPA decisions, which may either encourage or restrict project development in some areas.

Typical emission levels caused by renewable energy facilities would probably not contribute to regional air quality degradation. Primary air quality impacts would be during construction, which is typically limited to the first few years of project development. (See Appendix R1.2-1 for examples of construction-phase emissions for existing projects in the DRECP area.) Lower-level emissions typically occur during project operations and include routine site upkeep, security patrols, stationary sources like emergency generators and auxiliary boilers, employee transportation, and vegetation removal.

Construction activities for solar, wind, geothermal, and right-of-way development include mobilization, land clearing, earth moving, road construction, ground excavation, drilling and blasting, foundation construction, and installation activities. Heavy equipment used during site preparation includes bulldozers, scrapers, trucks, cranes, rock drills, and blasting equipment.

Construction and operation activities would increase particulate matter and precursors to PM_{10} and $PM_{2.5}$; many air basins are in nonattainment for these two pollutants. Increased amounts of ozone precursors (volatile organic compounds [VOCs] and nitrogen oxides [NO_x]) would result from engine exhaust emissions, which could further exacerbate ozone nonattainment levels.

Increased health risks would result from human exposure to excessive concentrations of hazardous or toxic air pollutants in emissions from gasoline and diesel-powered equipment. Diesel particulate matter is a designated toxic air contaminant in California.

Summary Description of Alternatives. As described in the Draft DRECP and EIR/EIS, the Renewable Energy Action Team agencies anticipate that renewable generation totaling 20,000 megawatts (MW) could be located within each of the alternatives in the DRECP area. Based on DFAs defined in each alternative, total proposed generation located on BLM lands would vary among those alternatives:

- 9,792 MW in the No Action Alternative
- 8,175 MW in the Preferred Alternative
- 3,042 MW in Alternative 1
- 10,726 MW in Alternative 2
- 6,376 MW in Alternative 3
- 7,094 MW in Alternative 4

IV.2.2.1 Impacts of Renewable Energy and Transmission Development

IV.2.2.1.1 Impacts of Site Characterization

Typical air impacts from site characterization activities—which include developing temporary access roads, conducting site reconnaissance, drilling geotechnical borings, and constructing meteorological towers—would be the same for each renewable energy technology (with the addition of specialized surveys for geothermal development). A description of these activities appears in Volume II, Section II.3.3.1.

IV.2.2.1.2 Impacts of Construction and Decommissioning

Typical air quality impacts from construction and decommissioning are from fugitive dust from grading (where allowed by the local agency), vehicles driving on unpaved surfaces or roads, and emissions from heavy-duty construction equipment and vehicles carrying both construction materials and workers. These emissions occur during site development and preparation, transmission line development, building and roadway construction, and during decommissioning and facility removal. The types of emissions would be the same for each renewable energy technology. In-depth lists of these activities appear in Volume II, Sections II.3.3.1.

High levels of construction-related emissions can exacerbate regional nonattainment or expose sensitive receptors to substantial concentrations of hazardous or toxic air pollutants. Assessing air quality impacts from construction usually requires project-specific quantification of the air pollutants emitted by construction activities for each phase of site development, for each project.

Environmental documents for existing renewable energy projects in the DRECP area show a wide range in levels of construction-related emissions and depend, among other factors, on each project's particular accessibility, phasing or sequencing, and its fleet of construction vehicles and equipment. Greater levels of emissions occur at sites with the greatest generating capacities. On average, emissions during a typical project's construction phase are measured for each MW of installed capacity (see Section III.2.8 and Appendix R1.2-1):

- 0.29 tons of NO_x per MW of installed capacity
- 0.07 tons of VOC per MW of installed capacity
- 0.20 tons of PM_{10} per MW of installed capacity
- 0.04 tons of $PM_{2.5}$ per MW of installed capacity

IV.2.2.1.3 Impacts of Operations and Maintenance

Emissions are caused by operations and maintenance activities including routine site upkeep, security patrols, emergency generator use, employee transportation, and vegetation removal. Dust emissions also come from ground disturbances from access and spur road maintenance. Natural gas, solar thermal auxiliary heating, and gasoline and diesel fuel used for facility maintenance emit combustion by-products. Backup power supplies or fire water-pumping engines could also generate emissions if long-term operation and maintenance include diesel-powered emergency-use engines at substations and renewable energy project sites. In-depth lists of operations and maintenance activities are shown in Volume II, Section II.3.3.1. High

levels of emissions can exacerbate regional nonattainment or expose sensitive receptors to substantial concentrations of hazardous or toxic air pollutants.

Geothermal well venting emissions include hydrogen sulfide (H_2S), carbon dioxide (CO_2), mercury, arsenic, and boron (when these compounds are contained in geothermal steam). H_2S is generally the primary pollutant of concern, and typically an air monitoring system is installed during geothermal field development. People exposed to high concentrations of H_2S or other hazardous or toxic air pollutants could experience adverse health effects including both cancer and noncancer health risks. Even at very low concentrations, H_2S odors are objectionable since they smell like rotten eggs.

IV.2.2.2 Impacts of the Ecological and Cultural Conservation and Recreation Designations

In general, conservation designations would define large areas where development would be either very limited or prohibited. Construction activities would be limited, and new vehicle emissions would be permitted at very low levels. In areas with no development, there would be no sources of either construction emissions or stationary sources of emissions. There would also be no anticipated obstacles to meeting the requirements of National Ambient Air Quality Standards, SIP, and other rules within local AQMDs and APCDs.

Because BLM LUPA land designations would be managed to protect ecological, historic, cultural, scenic, scientific, and recreation resources and values, they would also provide general protection for air resources.

IV.2.3 Impact Analysis by Alternative

The following sections present impact analyses on air quality for the No Action Alternative, the Preferred Alternative, and Alternatives 1 through 4.

IV.2.3.1 No Action Alternative

IV.2.3.1.1 Impacts of Renewable Energy and Transmission Development

The No Action Alternative assumes the state's renewable energy goals would be achieved absent the DRECP and that renewable energy, transmission development, and mitigation for those projects in the DRECP area would be developed on a project-by-project basis consistent with past and ongoing renewable energy and transmission projects.

Impact Assessment

The No Action Alternative would result in Impacts AQ-1 through AQ-5 based on 61,500 acres of ground disturbance of BLM land, and additional disturbance due to transmission and operations activities, including activities in nonattainment areas of individual air basins within the DRECP area (see Section IV.2.3.1.1). BLM LUPA lands are within air basins in nonattainment for criteria pollutants, so existing conservation lands would be impacted by emissions from ground disturbance and other development activities. Typical mitigation measures for individual projects would reduce air quality impacts on BLM LUPA lands. Each impact is described below.

Impact AQ-1: Plan components would generate short-term air emissions that violate any air quality standard or contribute to an existing or projected air quality violation.

Development of renewable energy projects and transmission would cause an increase in construction dust and exhaust emissions from construction equipment and vehicles; these emissions could violate or contribute to an existing violation of air quality standards, which would in turn become an adverse air quality impact during construction. The sources of construction dust and the types of motor vehicle or off-road equipment sources would be similar at all project sites; all sites would require construction equipment and crews and create permanent ground disturbances under the No Action Alternative.

Based on the developable lands defined for the No Action Alternative, this level of generation includes about 9,800 MW that would be located on BLM-managed lands in the No Action Alternative. Based on existing projects in the DRECP area and emissions factors described as typical in Section IV.2.2 (see Section III.2.8 and Appendix R1.2-1), total construction emissions of nonattainment pollutants are estimated for the development of approximately 20,000 MW of installed capacity of renewable energy projects. Construction-phase emissions would be distributed across the DRECP area and would be gradually emitted over time until all projects are operational. For each specific project, a wide range of construction-phase emissions would occur, depending on, among other factors, each project's particular accessibility, its phasing or sequencing of activity, and its fleet of construction equipment. Based on factors typical of existing renewable energy projects in the DRECP area, total construction-phase emissions from approximately 20,000 MW of installed capacity, by 2040, would be:

- 5,900 tons of NO_x.
- 1,400 tons of VOCs.
- 4,100 tons of PM_{10}.
- 800 tons of $PM_{2.5}$.

The construction-phase emissions would occur in the Great Basin Valleys Air Basin, the Mojave Desert Air Basin, the Salton Sea Air Basin, and the San Diego Air Basin. Each of the four air basins would be affected by construction emissions, depending upon the locations of projects and types of technology, which may vary between alternatives.

Assuming that individual project sites would be developed to achieve an overall 20,000 MW of installed capacity by 2040, with a portion of the construction on BLM land, construction-phase emissions from BLM projects can be estimated. Table IV.2-2 shows the estimated amount of construction-phase emissions for the No Action Alternative in the BLM portion of the potential build-out.

Table IV.2-2
Estimated Construction-Phase Emissions, No Action Alternative

Alternative	Capacity (MW)	NO_x (tons)	VOC (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)
No Action Alternative (Total BLM Portion)	9,792	2,870	680	1,950	400
Total for DRECP Area	**20,000**	**5,900**	**1,400**	**4,100**	**800**

Source: Estimated construction-phase emissions for the DRECP area equal to the capacity (MW) multiplied by an average emission factor of total construction-phase emissions in tons per MW (from data for existing projects in the DRECP area presented in Volume III, Section III.2.8, and Appendix R1.2-1).

Dust emissions directly relate to the amount of ground disturbance during construction. Permanent ground disturbance under the No Action Alternative is on an estimated 61,500 acres of BLM land, not counting disturbance from transmission. These lands would become potential dust sources from increased ground disturbance during project development.

State Air Quality Standards

Under the No Action Alternative, projects would continue to be built within air basins that are state nonattainment areas for ozone and PM_{10}; construction activities would therefore generate emissions that could contribute to existing ozone and PM_{10} violations. All of the air basins available for renewable energy development under the No Action Alternative would therefore experience short-term air quality impacts during construction.

In addition to contributing to existing violations of the state ambient air quality standards for ozone and PM_{10}, construction activities would cause $PM_{2.5}$ impacts in two areas. The San Bernardino County portion of the federal Southeast Desert Modified Air Quality Management Area for ozone is classified as a $PM_{2.5}$ nonattainment area, as is the portion of the DRECP area within the San Diego Air Basin (see Figure III.2-8, State $PM_{2.5}$ Attainment Status, in Chapter III.2). Construction would generate emissions that would contribute to existing $PM_{2.5}$ violations in those areas.

Federal Air Quality Standards

The federal nonattainment areas of AQMDs and APCDs in the DRECP area are described in detail in Volume III, Section III.2.4. They are summarized in the following paragraphs.

The Great Basin Valleys Air Basin is in attainment for all pollutant standards except for those related to PM_{10}. The Owens Valley Planning Area is a serious PM_{10} nonattainment area, while the Coso Junction Planning Area is a PM_{10} maintenance area.

The Mojave Desert Air Basin is in attainment for all pollutant standards except for those related to ozone and PM_{10}. A large portion of San Bernardino County (including the Trona Planning Area) is a moderate PM_{10} nonattainment area. A portion of East Kern County in the basin is a serious PM_{10} nonattainment area, and the Indian Wells Planning Area (also in Kern County) is a PM_{10} maintenance area.

Portions of Los Angeles and San Bernardino counties in the West Mojave Desert are severe-15 1997 8-hour ozone nonattainment areas. A portion of Eastern Kern County within the basin is a marginal 2008 8-hour ozone nonattainment area, while portions of Los Angeles and San Bernardino counties are severe-15 2008 8-hour ozone nonattainment areas.

The Salton Sea Air Basin is in attainment for all pollutant standards except for those related to ozone, PM_{10}, and $PM_{2.5}$. The Coachella Valley (Riverside County) portion of the basin within the DRECP area is a serious PM_{10} nonattainment area, as is the Imperial Valley Planning Area in Imperial County. A portion of south-central Imperial County is nonattainment for the $PM_{2.5}$ 24-hour standard.

The Riverside County portion of the Salton Sea Air Basin is a severe-15 1997 8-hour ozone nonattainment area. The Imperial County portion of the Salton Sea Air Basin is a moderate 1997 8-hour ozone nonattainment area. The Riverside County portion of the Salton Sea Air Basin is a severe-15 2008 8-hour ozone nonattainment area. The Imperial County portion of the Salton Sea Air Basin is a marginal 2008 8-hour ozone nonattainment area.

The San Diego Air Basin is in attainment for all pollutant standards except for those related to ozone. The San Diego Air Basin is a marginal 2008 8-hour ozone nonattainment area.

Conclusion for Impact AQ-1

Renewable energy project construction would generate emissions that would contribute to existing ozone, PM_{10}, and $PM_{2.5}$ violations because these areas are within both federal and state nonattainment areas. These nonattainment air basins would experience short-term air quality impacts from an increase in dust and vehicle and equipment exhaust emissions.

These emissions could either violate air quality standards or exacerbate existing air quality violations for nonattainment and maintenance areas during the limited, short-term phases of construction.

Impact AQ-2: Long-term operations air emissions would violate air quality standards or contribute to air quality violations.

Project operations and maintenance activities would increase vehicle and equipment use and its exhaust emissions. These activities, on unpaved surfaces across disturbed project sites and on access roads, would cause dust emissions. For some projects, operations would require installation and use of new stationary or portable equipment. Emissions from these sources could violate or contribute to existing violations of air quality standards. Section IV.2.2.1.3 describes the types of activities and sources of emissions related to long-term operations and maintenance of renewable energy projects. Examples of the stationary sources of emissions from operations include:

- Solar thermal projects that require natural gas combustion for auxiliary heating. Stationary boilers or combustion turbines would emit combustion by-products including hazardous or toxic air pollutants, which in turn would increase air pollutant concentrations and create long-term impacts.
- Geothermal projects that require well venting, steam turbines, and cooling towers, which may release geothermal steam that contains hazardous or toxic air pollutants, aerosols, and particles dissolved in steam or cooling water; these factors would increase air pollutant concentrations and create long-term impacts.
- Backup power generators and fire water-pumping engines that would emit by-products of diesel or natural gas combustion including hazardous or toxic air pollutants that could increase air pollutant concentrations.

All these renewable energy technologies would require operations and maintenance. Routine upkeep of project sites, security patrols, employee commuting, and vegetation removal all cause dust emissions from both vehicles and equipment that travel on unpaved surfaces. These activities would also increase the use of portable equipment and motor vehicles that emit by-products of fuel combustion. Because these activities would occur within air basins that are already in state or federal level nonattainment for ozone, PM_{10}, and $PM_{2.5}$, emissions from these operations and maintenance activities would exacerbate nonattainment conditions.

Impact AQ-3: Operations would expose air quality–sensitive receptors to adverse air pollutant concentrations.

Development of renewable energy projects and transmission under the No Action Alternative would result in exhaust emissions from vehicles and equipment, dust emissions from activity on unpaved surfaces, and in some cases new stationary or portable sources of emissions. Hazardous or toxic air pollutants would also result from geothermal well venting, steam turbines, and cooling towers. These emissions would cause air quality impacts during project operations because sensitive receptors would potentially be exposed to concentrated air pollutants.

The areas available for renewable energy development under the No Action Alternative surround multiple cities with residences, hospitals, and schools including: Tehachapi, California City, Lancaster, Barstow, Adelanto, Victorville, Twentynine Palms, Blythe, Calipatria, Brawley, Imperial, Holtville, El Centro, and Calexico. New emissions sources from renewable energy projects could be close enough to these cities to expose people to high concentrations of pollutants. During the site selection and project permitting processes, adverse health impacts can be avoided by controlling emissions and providing sufficient distance between new sources of air pollution and nearby receptors. Because specific renewable energy project sites have not yet been identified, sensitive receptors could experience adverse air pollutant concentrations under the No Action Alternative.

Impact AQ-4: Operations would conflict with or obstruct implementation of applicable air quality plans.

Development of renewable energy projects and transmission under the No Action Alternative would result in emissions that could conflict with applicable air quality plans in nonattainment areas. The air quality management plan for each nonattainment area establishes control strategies requiring coordination between project developers, air permitting authorities, and other local agencies and jurisdictions. Subsequent projects developed without full implementation of these control strategies could delay attainment of ambient air quality standards in the air basins. This conflict potential would be limited to areas with existing violations of air quality standards.

Impact AQ-5: Operations would create objectionable odors affecting a substantial number of people.

Geothermal project operations would cause objectionable odors for people living within a mile of a geothermal project. Under the No Action Alternative, geothermal development is identified in the Imperial Borrego Valley ecoregion subarea. Because a substantial number of people live in this area, geothermal development and operations would include odor impacts. Stationary

sources within each geothermal project would be subject to local air district permitting requirements that would establish pollution controls to remove odorous compounds. Local permitting authorities would also consider the effects of objectionable odors. Although routine operations of geothermal facilities would include odor controls, air quality impacts could still occur with operations, accidental releases, or upset conditions.

Laws and Regulations

Existing laws and regulations would reduce the impacts of renewable energy projects in the absence of the DRECP. Relevant regulations are presented in the Regulatory Setting in Volume III. Because this EIS addresses amendments to BLM's land use plans, these plans are addressed separately and are not included in this section. The requirements of relevant regulations would reduce impacts through the following mechanisms:

- The Clean Air Act prohibits federal agencies from, among other things, issuing licenses or permits or approving any activity in a federal nonattainment area that do not conform to an approved SIP. Where the federal action is issuing a permit, license, or other approval for an individual nonfederal project, the federal agency must evaluate the conformity of direct and indirect emissions from construction activities to federally administered lands; the federal agency may then require the project to reduce air emissions as a condition of its decision.
- The California Clean Air Act requires that AQMDs and APCDs implement regulations that control stationary-source emissions through local district rules and permit requirements, and to also implement local air quality management plans that demonstrate how attainment would be achieved. Applicable air quality plans may include programs and control strategies to reduce emissions from mobile sources through the adoption and enforcement of transportation control measures (e.g., demonstrating the overall effectiveness of the air quality program, reducing nonattainment pollutants or their precursors at a rate of 5% per year, or reducing population exposure to severe nonattainment pollutants according to a prescribed schedule).
- The California Air Toxics Program establishes the process for identifying and controlling toxic air contaminants, including provisions to raise public awareness of significant toxic exposures and how to reduce risk.
- The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588 Connelly) requires that stationary sources report the types and quantities of certain substances routinely released into the air (e.g., collect emission data, identify facilities with localized impacts, assess health risks, notify nearby residents of significant risks, and reduce those significant risks to acceptable levels).

- The Children's Environmental Health Protection Act, SB 25 (Chapter 731 Escutia, Statutes of 1999), focuses on children's exposure to air pollutants. This act requires that the Air Resources Board review air quality standards from a child's health perspective, evaluate the statewide air monitoring network, and develop any additional air toxic control measures needed to protect children's health.
- The SIP is a collection of documents that sets forth the state's strategies for achieving federal air quality standards. In California, each local air district is responsible for preparing and implementing the portions of the SIP that apply within each local jurisdiction. The DRECP area boundaries encompass areas under the jurisdiction of multiple air districts (Volume III, Figure III.2-2, State Air Districts).

Design Features of the Solar PEIS

- The Solar Programmatic EIS (PEIS) includes numerous design features (Appendix W) that would reduce the impacts of solar energy development on BLM lands, including:
    - Measures to minimize impacts on air quality from siting design and construction (e.g., using Tier 3, Tier 4 and Tier 4i equipment, preparing a dust abatement plan, and managing unpaved roads and disturbed areas—as defined in AQC2-1 in the Solar PEIS).
    - Measures to minimize impacts on air quality from operations, maintenance, reclamation, and decommissioning (e.g., monitoring and treating areas, reapplying palliatives, and ensuring compliance of all combustion sources with federal and state emission standards—defined in AQC3-1 and AQC4-1 in the Solar PEIS).

Typical Mitigation Measures

Air quality mitigation adopted for approved projects is assumed to be similar to the types of mitigation measures that would apply in the future under the No Action Alternative. Following are the types of mitigation that would likely be implemented under the No Action Alternative.

Typical Mitigation Measures for Solar and Wind Projects

1. Air Quality Construction Mitigation Manager: The project owner shall designate and retain an on-site air quality construction mitigation manager who shall be responsible for directing and documenting compliance with mitigation measures (e.g., fugitive dust control, dust plume response requirements, and diesel-fueled engine control) for the entire project site and linear facility construction. The air

quality construction mitigation manager shall have full access to all areas of construction on the project site and linear facilities and shall have the authority to stop any or all construction activities when warranted by applicable construction mitigation conditions.

2. Air Quality Construction Mitigation Plan: The project owner shall provide an Air Quality Construction Management Plan for approval that details steps to be taken and the reporting requirements necessary to ensure compliance with mitigation measures for construction fugitive dust control, dust plume response requirements, and diesel-fueled engine control.
3. Construction Fugitive Dust Control: The air quality construction mitigation manager shall submit documentation in each Monthly Compliance Report that demonstrates compliance with Air Quality Construction Mitigation Plan measures for minimizing fugitive dust emissions from construction activities and preventing all fugitive dust plumes that do not comply with the performance standards identified for the dust plume response requirement. The definition of stabilized surface for purposes of fugitive dust control means that fugitive dust would be controlled by using a soil binding agent or other effective means to suppress and keep dust from leaving project boundaries, and also to neither cause nor create fugitive dust plumes that could leave the project site.
4. Dust Plume Response Requirement: The air quality construction mitigation manager shall monitor all construction activities for visible dust plumes. Observations of visible dust plumes that could potentially either (1) be transported off the project site and within 400 feet upwind of any regularly occupied structures not owned by the project owner, or (2) extend 200 feet beyond the centerline of the construction of linear facilities, indicating ineffectiveness of existing mitigation measures.
5. Diesel-Fueled Engine Control: The air quality construction management manager shall submit, in the Monthly Compliance Report, a table that demonstrates compliance with Air Quality Construction Mitigation Plan measures for controlling diesel construction-related combustion emissions.
6. Obtain only dedicated on-road or off-road vehicles for mirror-washing activities and other maintenance activities that meet either California's on-road vehicle emission standards or applicable EPA/California EPA off-road engine emission standards (for the latest model year available when obtained).
7. Provide a site Operations Dust Control Plan, including all applicable fugitive dust control measures that ensure that operations and maintenance activities will prevent fugitive dust plumes.

8. Provide copies of all district-issued authority-to-construct and permit-to-operate documents for the facility.
9. Submit Quarterly Operation Reports that both demonstrate compliance and highlight incidences of noncompliance.
10. Operate the cooling towers with high efficiency mist eliminators (to reduce drift to no more than 0.0005% of recirculating water flow); determine and report on water quality.

Typical Mitigation Measures for Geothermal Projects

1. Fugitive PM_{10} control measures shall be implemented where feasible.
2. Construction equipment emissions control measures shall be implemented at the project site during all construction activities, when feasible.
3. Geothermal steam vents shall be equipped with suitable odor control and air pollution control systems. An example is a regenerative thermal oxidizer unit and caustic scrubber system that would abate combustible non-condensible gas air pollutant emissions during project operations. High-efficiency drift eliminators shall also be used to abate PM_{10} emissions from cooling towers.
4. Geothermal facilities shall mitigate project air pollutants by purchasing emission offset credits, where available, from one or more entities before seeking construction permits.
5. Geothermal facilities shall achieve synthetic minor source status by controlling project hazardous air pollutants.

IV.2.3.1.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

The No Action Alternative has no new conservation designations, but without approval of an action alternative, there would be continued protection of existing Legislatively and Legally Protected Areas such as wilderness areas. In addition, under the No Action Alternative, renewable energy projects would continue to be evaluated and approved with project-specific mitigation requirements.

IV.2.3.1.3 Impacts of Transmission Outside the DRECP Area

Outside of the DRECP area, additional transmission lines would be needed to deliver additional electricity to load centers (areas of high demand). It is assumed that new transmission lines outside of the DRECP area would use existing transmission corridors between the DRECP area and existing substations in the more populated coastal areas of

the state. Areas outside of the DRECP area through which new transmission lines might be constructed are San Diego, Los Angeles, North Palm Springs–Riverside, and Central Valley. These areas and the status of their air resources are described in Volume III, Chapter III.2, Section III.2.8.

Impact AQ-1: Plan components would generate short-term air emissions that violate any air quality standard or contribute to an existing or projected air quality violation.

Construction of new transmission lines outside of the DRECP area would result in short-term impacts in transmission rights-of-way, which would create ground disturbance. The air basins in which transmission lines would be constructed are state and federal nonattainment areas. They would therefore experience short-term impacts from ground-disturbing activities, most notably for PM_{10}, $PM_{2.5}$, and ozone.

Operational Impacts. Operation and maintenance of the new lines would require vehicle and helicopter use for periodic inspections and repairs. The use of vehicles on unpaved access roads can generate dust, but this would occur infrequently. Emissions from the equipment and motor vehicles used for routine operation and maintenance of the transmission lines, and the dust caused by crews occasionally inspecting or repairing those lines, would occur at much lower levels than during construction. The following impacts to air quality would occur during operations, but at much lower levels than during construction:

- Impact AQ-2: Long-term operations air emissions would violate air quality standards or contribute to air quality violations.
- Impact AQ-3: Operations would expose air quality–sensitive receptors to adverse air pollutant concentrations.

The following impacts to air quality would not occur during operations of transmission projects:

- Impact AQ-4: Operations would conflict with or obstruct implementation of applicable air quality plans.
- Impact AQ-5: Operations would create objectionable odors affecting a substantial number of people.

IV.2.3.2 Preferred Alternative

IV.2.3.2.1 Impacts of Renewable Energy and Transmission Development

The Preferred Alternative integrates renewable energy elements and conservation elements to moderate conflicts in DFAs between biological and nonbiological resources and provide development flexibility. The DFAs are concentrated in a few locations, with some smaller DFAs

throughout the DRECP area. DFAs under the Preferred Alternative would include 81,000 acres of permanent disturbance of BLM land, primarily from solar projects.

Impact Assessment

Impact AQ-1: Plan components would generate short-term air emissions that violate any air quality standard or contribute to an existing or projected air quality violation.

The construction of renewable energy technologies and transmission would increase dust and exhaust emissions from construction equipment and vehicles, which could violate or contribute to an existing violation of air quality standards, which would in turn be a short-term air quality impact during construction. The sources of construction dust and types of motor vehicle or off-road equipment sources would be similar at all development sites. Ground disturbance would also generate dust.

The Preferred Alternative covers the same air basins as the No Action Alternative, and state and federal air quality standards are the same as those described in Section IV.2.3.1.1.1. Aside from site-specific differences and differences in the acres of dust-generating activities, the Preferred Alternative would result in the same total emissions from construction-phase activities for developing approximately 20,000 MW of installed capacity as under the No Action Alternative.

Each air basin would be affected by construction emissions, depending on the geographic distribution of the development mix under the Preferred Alternative. Table IV.2-3 shows the estimated amount of construction-phase emissions for the BLM portion of the potential build-out.

Table IV.2-3
Estimated Construction-Phase Emissions, Preferred Alternative

Alternative	Capacity (MW)	NO_x (tons)	VOC (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)
Preferred Alternative (Total BLM Portion)	8,175	2,390	570	1,620	340
Total for DRECP Area	**20,000**	**5,900**	**1,400**	**4,100**	**800**

Source: Estimated construction-phase emissions for the DRECP area equal to the capacity (MW) multiplied by an average emission factor of total construction-phase emissions in tons per MW (from data for existing projects in the DRECP area presented in Volume III, Section III.2.8, and Appendix R1.2-1).

The nonattainment air basins with renewable energy development under the Preferred Alternative would experience a short-term air quality impact from both increased dust emissions and vehicle and equipment exhaust emissions. These emissions could violate air

quality standards or exacerbate existing air quality violations and nonattainment conditions during the short-term phases of construction.

Impact AQ-2: Long-term operations air emissions would violate air quality standards or contribute to air quality violations.

Operation of renewable energy technologies and transmission would increase vehicle and equipment use and its associated exhaust emissions. Activities on unpaved surfaces across disturbed project sites and on access roads would also cause dust emissions. Some projects would require stationary or portable emissions sources during operations. Emissions from these sources could violate or contribute to an existing violation of air quality standards. Examples of these activities and sources are listed in the Impact AQ-2 discussion for the No Action Alternative in Section IV.2.3.1.1.1.

All of the renewable energy technologies would require some operations and maintenance activities. Routine upkeep of the site, security patrols, employee transportation, and vegetation removal all cause dust emissions from vehicles and equipment travelling on unpaved surfaces. Because these activities would occur within both state and federal nonattainment areas, emissions from these operations and maintenance activities would exacerbate nonattainment conditions.

Impact AQ-3: Operations would expose air quality–sensitive receptors to adverse air pollutant concentrations.

Operation of renewable energy technologies and transmission would generate exhaust emissions from vehicles and equipment, dust emissions from activity on unpaved surfaces, and, in some cases, from stationary or portable emissions sources. During the site selection and project permitting processes, adverse health impacts can be avoided by controlling emissions and providing sufficient separation between new sources of air pollution and nearby receptors. Depending on the development sites, renewable energy and transmission emissions sources could be close enough to one another to expose sensitive receptors to adverse air pollutant concentrations under the Preferred Alternative.

The areas available for renewable energy development under the Preferred Alternative surround multiple cities with residences, hospitals, and schools including: Tehachapi, California City, Lancaster, Barstow, Adelanto, Victorville, Blythe, Calipatria, Brawley, Imperial, Holtville, El Centro, and Calexico. Because the specific renewable energy project sites are not yet known, sensitive receptors could experience adverse air pollutant concentrations under the Preferred Alternative.

Impact AQ-4: Operations would conflict with or obstruct implementation of applicable air quality plans.

Operation of renewable energy technologies and transmission would result in project-related emissions that could conflict with applicable air quality plans in nonattainment areas if projects do not fully implement control strategies.

Impact AQ-5: Operations would create objectionable odors affecting a substantial number of people.

Geothermal technology creates objectionable odors. Under the Preferred Alternative, geothermal technology is planned within DFAs in either the Owens River Valley or the Imperial Borrego Valley ecoregion subareas. Because a substantial number of people live in these areas, geothermal development could create adverse air quality impacts for people living within one mile of a geothermal project.

Local permitting authorities would consider the effects of objectionable odors. Although routine operations of geothermal facilities would include required odor controls, operations, accidental releases, or upset conditions could cause air quality impacts.

Impacts on Variance Process Lands

Variance Process Lands are neither conservation lands nor DFAs. They are a subset of the variance lands identified in the Solar PEIS Record of Decision (ROD) and additional lands that, based on current information, have moderate to low ecological value and ambiguous value or potential for renewable energy development. If renewable energy projects are built on Variance Process Lands, LUPA would not be required, so the environmental review process would be simpler than if the location were left as undesignated.

Variance Process Lands for each alternative are shown in Chapter IV.1, Table IV.1-2, and in Volume II, Chapter II.3, Figure II.3-1 for the Preferred Alternative. Development of Variance Process Lands would have similar air quality effects as those described in Impacts AQ-1 through AQ-5.

Impact Reduction Strategies

Implementation of the Proposed LUPA would conserve some desert lands while clearing the way for the development of renewable energy generation and transmission facilities on other lands. There are two ways that the impacts of renewable energy development covered by the Proposed LUPA could be lessened. First, the Proposed LUPA incorporates the Design Features of the Solar PEIS as well as Conservation and Management Actions (CMAs) for each alternative, including specific biological conservation designations and

LUPA components. Second, the implementation of existing laws, orders, regulations, and standards would effectively reduce the overall impacts of project development.

Design Features of the Solar PEIS

The Solar PEIS design features for minimizing emissions described for the No Action Alternative (Section IV.2.3.1.1) would similarly reduce the air quality impacts of this alternative.

Conservation and Management Actions

The CMAs that apply to air resources follow:

- DRECP area LUPA-AIR-1: All activities must meet the following requirements:
  - Applicable National Ambient Air Quality Standards (Section 109)
  - State Implementation Plan (SIP) (Section 110)
  - Control of pollution from federal facilities (Section 118), including nonpoint sources
  - Prevention of significant deterioration, including to visual impacts in mandatory federal Class I areas (Section 160 et seq.)
  - Conformity analyses and determinations (Section 176[c])
  - Best management practices on a case-by-case basis
  - Applicable local air quality management jurisdictions (e.g., Rule 403 South Coast Air Quality Management District)
- LUPA-AIR-2: Because project authorizations are a federal undertaking, air quality standards for fugitive dust should exceed local standards and should be applied continuously 7 days a week.
- LUPA-AIR-3: Where impacts to air quality may be significant or require documentation, discussion, or analysis of Ambient Air Quality conditions (baseline or existing), National Ambient Air Quality Standards, criteria pollutant nonattainment areas, and the potential air quality impacts of a proposed project (including cumulative and indirect impacts and greenhouse gas emissions). This content is necessary to disclose the potential impacts from temporary or cumulative degradation of air quality. The discussion will include a description and estimate of air emissions from potential construction and maintenance activities and proposed mitigation measures to minimize net PM_{10} and $PM_{2.5}$ emissions. The documentation will specify the emission sources by pollutant from mobile sources, stationary sources, and ground disturbances. A Construction Emissions Mitigation Plan will be developed.

- LUPA-AIR-4: Fugitive dust is the number one source of PM_{10} and $PM_{2.5}$ pollution in the Mojave and Sonoran deserts. Where impacts to air quality may be significant, the analysis must include a model of the sources of PM_{10} and $PM_{2.5}$ prior to construction and show their timing, duration, and transport both on and off a project site. Modeling will also identify how the generation and movement of PM_{10} and $PM_{2.5}$ will change during and after construction of the project, under all alternatives.
- LUPA-AIR-5: A Fugitive Dust Control Plan will be developed for all projects where a National Environmental Policy Act analysis shows an impact to air quality from fugitive dust.

The following biological resource Conservation and Management Action would have a beneficial effect on air quality:

- LUPA-BIO-6 (partial): The application of water and/or other palliatives for dust abatement in construction areas and during project operations and maintenance will be done with the minimum amount of water necessary to meet safety and air quality standards and in a manner that prevents the formation of puddles, which could attract wildlife predators.

Laws and Regulations

Similar to the No Action Alternative, existing laws and regulations will reduce certain air quality impacts. Relevant regulations are presented in the Regulatory Setting in Volume III. The requirements of relevant laws and regulations are summarized for the No Action Alternative in Section IV.2.3.1.1.1.

IV.2.3.2.2 Impacts of Conservation Designations

The Preferred Alternative would provide more than 5 million additional acres within the DRECP area with protective land designations and additional acreages with recreational values. Establishing lands with protective designations would restrict development and the potential for adverse air quality impacts.

Because BLM LUPA land designations protect ecological, historical, cultural, scenic, scientific, and recreational resources and values, the creation of air quality impacts from renewable energy projects would likely be limited. While other land uses within these areas are allowed, they must be compatible with the resources and values that the land designation is intended to protect. Impacts to air quality are not likely from changes to BLM land designations.

IV.2.3.2.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside of the DRECP area on air quality would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.2.3.1.5.1.

IV.2.3.2.4 Comparison of the Preferred Alternative With No Action Alternative

The Preferred Alternative would result in long-term impacts from construction dust from ground disturbance and exhaust emissions from construction equipment and vehicles. It would result in 81,000 acres of permanent disturbance of BLM land, compared with 100,000 acres under the No Action Alternative. The acres of transmission remain about the same.

The Preferred Alternative covers the same air basins as the No Action Alternative, and the state and federal air quality standards are the same as those described in Section IV.2.3.1.1.1. The air basins with renewable energy development under the Preferred Alternative that are within state and federal nonattainment areas would experience similar impacts from development activities. However, the Preferred Alternative would shift development from eastern Kern County to the West Mojave Desert of San Bernardino County, which is an area with more severe air quality violations.

The Preferred Alternative would not have project development near Twentynine Palms, so sensitive receptors would not be exposed to substantial pollutant concentrations in this location.

The Preferred Alternative would create more emissions from ground disturbance and other development activities in the Imperial Borrego Valley, Mojave and Silurian Valley, Owens River Valley, Pinto Lucerne Valley and Eastern Slopes, and West Mojave and Eastern Slopes ecoregion subareas than under the No Action Alternative.

The BLM LUPA would not affect existing BLM guidance on air quality but would change the pattern of development. Compared to the No Action Alternative, less development may take place on BLM lands under the Preferred Alternative, resulting in fewer air emissions on and around those lands.

IV.2.3.3 Alternative 1

IV.2.3.3.1 Impacts of Renewable Energy and Transmission Development

The primary driver of Alternative 1 is confining renewable energy development to low-conflict disturbed lands, thereby providing the fewest conflicts between biological and nonbiological resources. Development flexibility would therefore be limited. There would be 52,000 acres of permanent disturbance of BLM land from renewable energy development.

Impact Assessment

Impact AQ-1: Plan components would generate short-term air emissions that violate any air quality standard or contribute to an existing or projected air quality violation.

Construction of renewable energy technologies and transmission would increase dust and exhaust emissions from construction equipment and vehicles, which could violate or contribute to existing violations of air quality standards, which in turn could create air quality impacts under Alternative 1. The sources of construction dust and the types of motor vehicle or off-road equipment sources would be similar at all development sites. Dust would also be generated by ground disturbance.

Alternative 1 covers the same air basins as the No Action Alternative, so state and federal air quality standards are the same as those described in Section IV.2.3.1.1.1. Aside from site-specific differences and differences in the acreage of dust-generating activities, this alternative would result in the same total emissions from construction-phase activities as under the No Action Alternative and the Preferred Alternative.

Each air basin would be affected by construction emissions, depending on the geographic distribution of the development mix under Alternative 1. Table IV.2-4 shows estimated construction-phase emissions for the BLM portion of the potential build-out.

Table IV.2-4
Estimated Construction-Phase Emissions, Alternative 1

Alternative	Capacity (MW)	NO_x (tons)	VOC (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)
Alternative 1 (Total BLM Portion)	3,042	890	210	600	120
Total for DRECP Area	**20,000**	**5,900**	**1,400**	**4,100**	**800**

Source: Estimated construction-phase emissions for the DRECP area equal to the capacity (MW) multiplied by an average emission factor of total construction-phase emissions in tons per MW (from data for existing projects in the DRECP area presented in Volume III, Section III.2.8, and Appendix R1.2-1).

The nonattainment air basins with renewable energy development under Alternative 1 would experience short-term air quality impacts from increases in dust emissions and vehicle and equipment exhaust emissions from project development. These emissions could violate air quality standards or exacerbate existing air quality violations and nonattainment conditions during the short-term phases of construction.

Impact AQ-2: Long-term operations air emissions would violate air quality standards or contribute to air quality violations.

Operation of renewable energy technologies and transmission would include operations and maintenance activities that would increase vehicle and equipment emissions, dust emissions, and, for some projects, new stationary or portable emissions sources. Emissions from these sources could violate or contribute to an existing violation of air quality standards. Examples of these activities and sources are listed in the Impact AQ-2 discussion for the No Action Alternative in Section IV.2.3.1.1.1.

All of the renewable energy technologies would require some operations and maintenance activities that would cause new sources of dust emissions and other emissions from fossil-fueled equipment. Because these activities would be within both state and federal nonattainment areas, emissions from the operations and maintenance activities would exacerbate nonattainment conditions.

Impact AQ-3: Operations would expose air quality–sensitive receptors to adverse air pollutant concentrations.

Operation of renewable energy technologies and transmission would result in exhaust emissions from vehicles and equipment, dust emissions from activities on unpaved surfaces, and, in some cases, new stationary or portable sources of emissions. Depending on the development sites, new emissions sources could be close enough to sensitive receptors to expose them to adverse air pollutant concentrations under Alternative 1.

The areas available for renewable energy development under Alternative 1 surround multiple cities with residences, hospitals, and schools including: Tehachapi, Lancaster, Adelanto, Victorville, Blythe, Calipatria, and Calexico. Because the specific renewable energy project sites are not yet known, sensitive receptors could experience adverse air pollutant concentrations under Alternative 1.

Impact AQ-4: Operations would conflict with or obstruct implementation of applicable air quality plans.

Operation of renewable energy technologies and transmission would result in project-related emissions that could conflict with applicable air quality plans in nonattainment areas if projects do not fully implement control strategies.

Impact AQ-5: Operations would create objectionable odors affecting a substantial number of people.

Geothermal technology may cause objectionable odors for people within one mile of geothermal vents or other geothermal system components. Under Alternative 1, geothermal technology is planned within DFAs in the Imperial Borrego Valley, Mojave and Silurian Valley, and the West Mojave and Eastern Slopes ecoregion subareas. Because a substantial number of people live in these areas, geothermal development could create an air quality impact for people near the odor sources. Although routine operations of geothermal facilities would include odor controls, an air quality impact could still occur from operations, accidental releases, or upset conditions.

Impacts on Variance Process Lands

Variance Process Lands are neither conservation lands nor DFAs. They are a subset of the variance lands identified in the Solar PEIS ROD and additional lands that, based on current information, have moderate to low ecological value and ambiguous potential for renewable energy development. If renewable energy development occurs on Variance Process Lands, LUPA would not be required, so the environmental review process would be simpler than if the location were left as undesignated.

Variance Process Lands for each alternative are shown in Chapter IV.1, Table IV.1-2 and in Volume II, Chapter II.4, Figure II.4-1 for Alternative 1. Development of Variance Process Lands would have similar air quality effects as described in Impacts AQ-1 through AQ-5.

Impact Reduction Strategies and Mitigation

Implementation of the proposed LUPA would result in the conservation of some desert lands as well as the development of renewable energy generation and transmission in other lands. There are two ways that the impacts of the renewable energy development covered by LUPA could be lessened. First, the proposed LUPA incorporates CMAs for each alternative, including specific biological conservation designation components and LUPA components. Second, the implementation of existing laws, orders, regulations, and standards would reduce the impacts of project development.

Design Features of the Solar PEIS

The Solar PEIS design features for minimizing emissions described in the No Action Alternative (Section IV.2.3.1.1) would reduce the air quality impacts of this alternative.

Conservation and Management Actions

The conservation strategy for Alternative 1 (presented in Volume II, Section II.4.4) defines specific actions that would reduce the impacts of this alternative. The conservation strategy includes definitions for conservation designations and specific CMAs for the Preferred Alternative (see Section IV.2.3.2.1 for a list of CMAs).

Laws and Regulations

Similar to the No Action Alternative, existing laws and regulations will reduce certain impacts of project development. Relevant regulations are presented in the Regulatory Setting in Volume III. The requirements of relevant laws and regulations are summarized for the No Action Alternative in Section IV.2.3.1.1.1.

IV.2.3.3.2 Impacts of Conservation Designations

Alternative 1 would provide more than 5.5 million additional acres within the DRECP area with protective land designations and additional acres designated for recreation. Establishing lands with protective designations would restrict development and its potential for air quality impacts.

Because BLM LUPA land designations protect ecological, historical, cultural, scenic, scientific, and recreational resources and values, the creation of air quality impacts would likely be limited. Land uses within these areas are allowed if they are compatible with the resources and values that the land designation is intended to protect. Impacts to air quality are not likely from changes to BLM land designations.

IV.2.3.3.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside of the DRECP area on air quality would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.2.3.1.5.1.

IV.2.3.3.4 Comparison of Alternative 1 With Preferred Alternative

Alternative 1 results in long-term impacts from construction dust from ground disturbance and exhaust emissions from construction equipment and vehicles.

Compared with the Preferred Alternative, Alternative 1 would result in much less ground disturbance on BLM land. Alternative 1 covers the same air basins as the Preferred Alternative, so state and federal air quality standards are the same as those described in Section IV.2.3.1.1.1. The air basins with renewable energy development under Alternative 1

that are within state and federal nonattainment areas would experience similar impacts from development activities. Mitigation measures would be the same for Alternative 1 and the Preferred Alternative.

Alternative 1 would not have development near California City, Barstow, Brawley, Imperial, El Centro, or Holtville, while the Preferred Alternative could do so; sensitive receptors would therefore not be exposed to substantial pollutant concentrations under Alternative 1.

Alternative 1 would create more emissions from ground disturbance and other development in the Imperial Borrego Valley, Mojave and Silurian Valley, Owens River Valley, Pinto Lucerne Valley and Eastern Slopes, and Providence and Bullion Mountains ecoregion subareas than under the Preferred Alternative.

The BLM LUPA would not affect existing BLM guidance on air quality but would change the pattern of development. Compared to the Preferred Alternative, less development could take place on BLM land under Alternative 1, resulting in fewer air emissions.

IV.2.3.4 Alternative 2

IV.2.3.4.1 Impacts of Renewable Energy and Transmission Development

Alternative 2 has the common goal with other alternatives of confining renewable energy development to low-conflict disturbed lands, thereby providing the fewest conflicts between biological and nonbiological resources. Alternative 2 would result in the permanent disturbance of 88,000 acres of BLM land.

Impact Assessment

Impact AQ-1: Plan components would generate short-term air emissions that violate any air quality standard or contribute to an existing or projected air quality violation.

All of the Proposed LUPA components of renewable energy technologies and transmission would increase construction dust and exhaust emissions from construction equipment and vehicles and could also violate or contribute to existing violations of air quality standards, which in turn would create air quality impacts under Alternative 2. The sources of construction dust and types of motor vehicle and off-road equipment would be similar at all development sites. Ground disturbance would also generate dust.

Alternative 2 covers the same air basins as the No Action Alternative, so state and federal air quality standards are the same as those described in Section IV.2.3.1.1.1. Aside from site-specific differences and differences in the acreage of dust-generating activities, this

alternative would result in the same total emissions from construction-phase activities as under the No Action Alternative and the Preferred Alternative.

Each air basin would be affected by construction emissions, depending on the geographic distribution of the development mix under Alternative 2. Table IV.2-5 shows the estimated construction-phase emissions for the BLM portion of the potential build-out.

Table IV.2-5
Estimated Construction-Phase Emissions, Alternative 2

Alternative	Capacity (MW)	NO_x (tons)	VOC (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)
Alternative 2 (Total BLM Portion)	10,726	3,140	740	2,130	440
Total for DRECP Area	**20,000**	**5,900**	**1,400**	**4,100**	**800**

Source: Estimated construction-phase emissions for the DRECP area equal to the capacity (MW) multiplied by an average emission factor of total construction-phase emissions in tons per MW (from data for existing projects in the DRECP area presented in Volume III, Section III.2.8, and Appendix R1.2-1).

The nonattainment air basins with renewable energy development under Alternative 2 would experience short-term air quality impacts from dust emissions and vehicle and equipment exhaust emissions from project development. These emissions could violate air quality standards or exacerbate existing air quality violations and nonattainment conditions during the short-term phases of construction.

Impact AQ-2: Long-term operations air emissions would violate air quality standards or contribute to air quality violations.

All of the Proposed LUPA components from renewable energy operations and maintenance activities would increase vehicle and equipment use and its associated exhaust emissions, dust emissions, and, for some projects, new stationary or portable emissions. Emissions from these sources could violate or contribute to existing violations of air quality standards. Examples of these activities and sources are listed in the Impact AQ-2 discussion for the No Action Alternative in Section IV.2.3.1.1.1.

All of the renewable energy technologies would require some operations and maintenance activities, which would in turn result in new sources of dust emissions and emissions from new fossil-fueled equipment. Because these activities would occur within both state and federal nonattainment areas, emissions from operations and maintenance activities would exacerbate nonattainment conditions.

Impact AQ-3: Operations would expose air quality–sensitive receptors to adverse air pollutant concentrations.

All of the Proposed LUPA components from renewable energy technologies and transmission would generate exhaust emissions from vehicles and equipment, dust emissions from activity on unpaved surfaces, and, in some cases, new stationary or portable sources of emissions. Depending on the development sites, new emissions sources could be close enough to sensitive receptors to expose them to adverse air pollutant concentrations under Alternative 2.

The areas available for renewable energy development under Alternative 2 surround multiple cities with residences, hospitals, and schools including: Tehachapi, California City, Lancaster, Adelanto, Victorville, Barstow, Blythe, Calipatria, Brawley, Imperial, El Centro, Holtville, and Calexico. Because specific renewable energy project sites are not yet known, sensitive receptors could experience adverse air pollutant concentrations under Alternative 2.

Impact AQ-4: Operations would conflict with or obstruct implementation of applicable air quality plans.

All development components from the renewable energy technologies and transmission would result in project-related emissions that could conflict with local air quality plans in nonattainment areas if projects do not fully implement the control strategies in those plans.

Impact AQ-5: Operations would create objectionable odors affecting a substantial number of people.

Geothermal technology may cause objectionable odors. Under Alternative 2, geothermal technology is planned within DFAs in the Owens River Valley, Mojave and Silurian Valley, or Imperial Borrego Valley ecoregion subareas. Because a substantial number of people live in these areas, geothermal development could create an air quality impact if people reside less than one mile from the odor sources. Although routine operations of geothermal facilities would need to include applicable odor controls, an air quality impact would occur if operations, accidental releases, or upset conditions would cause noticeable odors.

Impacts on Variance Process Lands

Variance Process Lands are neither conservation lands nor DFAs. They are a subset of the variance lands identified in the Solar PEIS ROD and additional lands that, based on current information, have moderate to low ecological value and ambiguous value for renewable energy. If renewable energy development occurs on Variance Process Lands, a LUPA would not be required, so the environmental review process would be somewhat simpler than if the location were left undesignated.

Variance Process Lands for each alternative are as shown in Chapter IV.1, Table IV.1-2 and in Volume II, Chapter II.5, Figure II.5-1 for the Alternative 2. Development of the Variance Process Lands would have similar air quality effects as described above under Impacts AQ-1 through AQ-5.

Impact Reduction Strategies and Mitigation

The implementation of the Proposed LUPA would result in conservation of some desert lands as well as the development of renewable energy generation and transmission facilities on other lands. There are two ways in which the impacts of the renewable energy development covered by the Proposed LUPA would be lessened. First, the Proposed LUPA incorporates CMAs for each alternative, including specific biological conservation designation components and LUPA components. Second, the implementation of existing laws, orders, regulations, and standards would reduce the impacts of project development.

Design Features of the Solar PEIS

The Solar PEIS design features for minimizing emissions described in the No Action Alternative (Section IV.2.3.1.1) would reduce air quality impacts.

Conservation and Management Actions

The conservation strategy for Alternative 2 (presented in Volume II, Section II.5.4) defines specific actions that would reduce the impacts of this alternative. The conservation strategy includes definition of the conservation designations and specific CMAs for the Preferred Alternative (see Section IV.2.3.2.1 for a list of relevant CMAs).

Laws and Regulations

Similar to the No Action Alternative, existing laws and regulations will reduce certain impacts of project development. Relevant regulations are presented in the Regulatory Setting in Volume III. The requirements of relevant laws and regulations are summarized for the No Action Alternative in Section IV.2.3.1.1.1.

IV.2.3.4.2 Impacts of Conservation Designations

Alternative 2 would provide more than over 5 million additional acres within the DRECP area with protective land designations and additional acres of recreation. Establishing lands with protective designations would restrict development and its potential for air quality impacts.

Because BLM LUPA land designations protect ecological, historical, cultural, scenic, scientific, and recreational resources and values, adverse air quality impacts would be limited. Land uses within these areas are allowed only if they are compatible with the resources and values that the land designation is intended to protect. Impacts to air quality are therefore not likely to result from changes to BLM land designations.

IV.2.3.4.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside of the DRECP area on air quality would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.2.3.1.5.1.

IV.2.3.4.4 Comparison of Alternative 2 With Preferred Alternative

Alternative 2 would have long-term impacts from construction dust from ground disturbance and exhaust emissions from equipment and vehicles. Compared with the Preferred Alternative, Alternative 2 would result in greater disturbance of BLM land.

Alternative 2 covers the same air basins as the Preferred Alternative, so state and federal air quality standards are the same as those described in Section IV.2.3.1.1.1. Projects in air basins under Alternative 2 that are within state and federal nonattainment areas would experience similar impacts from development. Mitigation measures would be the same for Alternative 2 and the Preferred Alternative.

Alternative 2 would not have development near Twentynine Palms, similar to the Preferred Alternative, so sensitive receptors would not be exposed to substantial pollutant concentrations in this location under either alternative.

Alternative 2 would create more emissions from ground disturbance and other development in the Mojave and Silurian Valley, Owens River Valley, Panamint Death Valley, Pinto Lucerne Valley and Eastern Slopes, Providence and Bullion Mountains, and West Mojave Eastern Slopes ecoregion subareas than under the Preferred Alternative.

The BLM LUPA would not affect existing BLM guidance on air quality but would change the pattern of development. Compared with the Preferred Alternative, Alternative 2 could result in more development, and hence greater air emissions, on BLM lands.

IV.2.3.5 Alternative 3

IV.2.3.5.1 Impacts of Renewable Energy and Transmission Development

Alternative 3 has the common goal with the other alternatives of confining renewable energy development to low-conflict disturbed lands, thereby providing the fewest conflicts between biological and nonbiological resources. The DFAs under Alternative 3 are dispersed, with less development planned for the Cadiz Valley and Chocolate Mountains, Imperial Borrego Valley, and West Mojave and Eastern Slopes ecoregion subareas. Minimum development flexibility would also result. Alternative 3 would cause the permanent disturbance of 69,000 acres of BLM land.

Impact Assessment

Impact AQ-1: Plan components would generate short-term air emissions that violate any air quality standard or contribute to an existing or projected air quality violation.

All of the activities associated with renewable energy technologies and transmission would increase construction dust and exhaust emissions from construction equipment and vehicles and could violate or contribute to existing violations of air quality standards, which would in turn impact air quality during construction under Alternative 3. Sources of construction dust and the types of motor vehicle or off-road equipment would be similar at all development sites. Ground disturbance would also generate dust.

Alternative 3 covers the same air basins as the No Action Alternative, so state and federal air quality standards are the same as those described in Section IV.2.3.1.1.1. Aside from site-specific differences and differences in the acreage of dust-generating activities, this alternative would result in the same total emissions from construction activities for developing approximately 20,000 MW of renewable energy installed capacity as under the No Action Alternative and the Preferred Alternative.

Each air basin would be affected by construction emissions, depending on the geographic distribution of the development mix under Alternative 3. Table IV.2-6 shows estimated construction emissions for the BLM portion of the potential build-out.

Table IV.2-6
Estimated Construction-Phase Emissions, Alternative 3

Alternative	Capacity (MW)	NO_x (tons)	VOC (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)
Alternative 3 (Total BLM Portion)	6,376	1,870	440	1,270	260
Total for DRECP Area	**20,000**	**5,900**	**1,400**	**4,100**	**800**

Source: Estimated construction-phase emissions for the DRECP area equal to the capacity (MW) multiplied by an average emission factor of total construction-phase emissions in tons per MW (from data for existing projects in the DRECP area presented in Volume III, Section III.2.8, and Appendix R1.2-1).

The nonattainment air basins with renewable energy development under Alternative 3 would experience short-term air quality impacts from an increase in dust emissions and vehicle and equipment exhaust emissions from project development. These emissions could violate air quality standards or exacerbate existing air quality violations and nonattainment conditions during the short-term phases of construction.

Impact AQ-2: Long-term operations air emissions would violate air quality standards or contribute to air quality violations.

All of the activities related to renewable energy technologies and transmission from operations and maintenance activities would increase vehicle and equipment use with its associated exhaust emissions, dust emissions, and, for some projects, new stationary or portable emissions sources. Emissions from these sources could violate or contribute to existing violations of air quality standards. Examples of these activities and sources are listed in the Impact AQ-2 discussion for the No Action Alternative in Section IV.2.3.1.1.1.

All of the renewable energy technologies would require some operations and maintenance activities, causing new sources of dust emissions and other sources that emit combustion by-products. Because these activities are within both state and federal nonattainment areas, emissions from operations and maintenance activities would exacerbate nonattainment conditions.

Impact AQ-3: Operations would expose air quality–sensitive receptors to adverse air pollutant concentrations.

All of the activities related to development of renewable energy and transmission projects would cause exhaust emissions from vehicles and equipment, dust emissions from activity on unpaved surfaces, and, in some cases, new stationary or portable sources of emissions. Depending on the development sites, new emissions sources from renewable energy projects could be close enough to sensitive receptors to expose them to adverse air pollutant concentrations under Alternative 3.

The areas available for renewable energy development under Alternative 3 surround multiple cities with residences, hospitals, and schools including: Tehachapi, California City, Lancaster, Adelanto, Victorville, Barstow, Blythe, Calipatria, and Calexico. Because the specific renewable energy project sites are not yet known, sensitive receptors could experience adverse air pollutant concentrations under Alternative 3.

Impact AQ-4: Operations would conflict with or obstruct implementation of applicable air quality plans.

All of the activities related to development of renewable energy and transmission projects would generate emissions that could conflict with applicable air quality plans in nonattainment areas if projects do not fully implement control strategies.

Impact AQ-5: Operations would create objectionable odors affecting a substantial number of people.

Geothermal projects may cause objectionable odors. Under Alternative 3, geothermal technology is planned within DFAs in the Owens River Valley, Mojave and Silurian Valley, and Imperial Borrego Valley ecoregion subareas. Because a substantial number of people live in these areas, geothermal development could create air quality impacts for people within one mile of odor sources. Although routine operations of geothermal facilities would include odor controls, air quality impacts could still occur from operations, accidental releases, or upset conditions.

Impacts on Variance Process Lands

Variance Process Lands are neither conservation lands nor DFAs. They are a subset of the variance lands identified in the Solar PEIS ROD and additional lands that, based on current information, have moderate to low ecological value and ambiguous potential for renewable energy development. If renewable energy development occurs on Variance Process Lands, LUPA would not be required, so the environmental review process would be simpler than if the location were left as undesignated.

Variance Process Lands for each alternative are as shown in Chapter IV.1, Table IV.1-2 and in Volume II, Chapter II.3, Figure II.3-1 for the Preferred Alternative. Development of the Variance Process Lands would have similar air quality effects as described in Impacts AQ-1 through AQ-5.

Impact Reduction Strategies and Mitigation

Implementation of the Proposed LUPA would result in the conservation of some desert lands as well as the development of renewable energy generation and transmission

facilities in other lands. There are two ways in which the impacts of the renewable energy development covered by the Proposed LUPA could be lessened. First, the Proposed LUPA incorporates CMAs for each alternative, including specific biological conservation designation components and LUPA components. Second, the implementation of existing laws, orders, regulations, and standards would reduce the impacts of project development.

Design Features of the Solar PEIS

The Solar PEIS design features for minimizing emissions described for the No Action Alternative (Section IV.2.3.1.1) would reduce the air quality impacts of this alternative.

Conservation and Management Actions

The conservation strategy for Alternative 3 (presented in Volume II, Section II.6.4) defines specific actions that would reduce the impacts of this alternative. The conservation strategy includes definition of the conservation designations and specific CMAs for the Preferred Alternative (see Section IV.2.3.2.1 for a list of the CMAs).

Laws and Regulations

Similar to the No Action Alternative, existing laws and regulations will reduce certain impacts of project development. Relevant regulations are presented in the Regulatory Setting in Volume III. The requirements of relevant laws and regulations are summarized for the No Action Alternative in Section IV.2.3.1.1.1.

IV.2.3.5.2 Impacts of Conservation Designations

Alternative 3 would provide more than 5 million additional acres within the DRECP area with protective land designations and additional acres for recreation. Establishing lands with protective designations would restrict development and its potential to impact air quality.

Because BLM LUPA land designations protect ecological, historical, cultural, scenic, scientific, and recreational resources and values, the creation of air quality impacts would be limited. Land uses within these areas are allowed only if they are compatible with the resources and values that the land designation is intended to protect. Impacts to air quality are therefore not likely from changes to BLM land designations.

IV.2.3.5.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside of the DRECP area on air quality would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.2.3.1.5.1.

IV.2.3.5.4 Comparison of Alternative 3 With Preferred Alternative

Alternative 3 results in long-term impacts from construction dust from ground disturbance and exhaust emissions from construction equipment and vehicles. Alternative 3 would result in less permanent disturbance of BLM land compared with the Preferred Alternative.

Alternative 3 covers the same air basins as the Preferred Alternative, so state and federal air quality standards are the same as those described in Section IV.2.3.1.1.1. The air basins with renewable energy development under Alternative 3 that are within state and federal nonattainment areas would experience similar impacts from development activities. The mitigation measures would be the same for Alternative 3 and the Preferred Alternative.

Alternative 3 would not have development activities near Twentynine Palms, similar to the Preferred Alternative; sensitive receptors would therefore not be exposed to substantial pollutant concentrations in this location under either alternative. Alternative 3 would not have development activities near Brawley, Holtville, Imperial, or El Centro, while the Preferred Alternative could; sensitive receptors would therefore not be exposed in these locations under Alternative 3.

Alternative 3 would create more emissions from ground disturbance and other development activities in the Imperial Borrego Valley, Mojave and Silurian Valley, Owens River Valley, Panamint Death Valley, Pinto Lucerne Valley and Eastern Slopes, Providence and Bullion Mountains, and West Mojave Eastern Slopes ecoregion subareas than under the Preferred Alternative.

The BLM LUPA would not affect existing BLM guidance on air quality but would change the pattern of development. Compared with the Preferred Alternative, Alternative 3 could result in less development, and hence fewer air emissions, on BLM lands.

IV.2.3.6 Alternative 4

IV.2.3.6.1 Impacts of Renewable Energy and Transmission Development

Similar to the Preferred Alternative, under Alternative 4, the DFAs on BLM lands have moderate conflict between biological and nonbiological resources and provide moderate

development flexibility. The DFAs are concentrated in few locations with some smaller DFAs throughout the DRECP area. However, there are fewer DFAs in the Imperial Borrego Valley ecoregion subarea under Alternative 4 than under the Preferred Alternative. Alternative 4 results in long-term impacts on 71,000 acres of BLM land.

Impact Assessment

Impact AQ-1: Plan components would generate short-term air emissions that violate any air quality standard or contribute to an existing or projected air quality violation.

All of the activities related to development of renewable energy technologies and transmission would increase construction dust and exhaust emissions from construction equipment and vehicles and could violate or contribute to existing violations of air quality standards, which would in turn create air quality impacts during construction under Alternative 4. The sources of construction dust and the types of motor vehicle or off-road equipment sources would be similar at all development sites. The ground disturbance would also generate dust.

Alternative 4 covers the same air basins as the No Action Alternative, so state and federal air quality standards are the same as those described in Section IV.2.3.1.1.1. Aside from site-specific differences and differences in the acreage of dust-generating activities, this alternative would result in the same total emissions from construction as under the No Action Alternative and the Preferred Alternative.

Each air basin would be affected by construction emissions, depending on geographic distribution of the development mix under Alternative 4. Table IV.2-7 shows estimated construction emissions for the BLM portion of the potential build-out.

Table IV.2-7
Estimated Construction-Phase Emissions, Alternative 4

Alternative	Capacity (MW)	NO_x (tons)	VOC (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)
Alternative 4 (Total BLM Portion)	7,094	2,080	490	1,410	290
Total for DRECP Area	**20,000**	**5,900**	**1,400**	**4,100**	**800**

Source: Estimated construction-phase emissions for the DRECP area equal to the capacity (MW) multiplied by an average emission factor of total construction-phase emissions in tons per MW (from data for existing projects in the DRECP area presented in Volume III, Section III.2.8, and Appendix R1.2-1).

The nonattainment air basins with renewable energy development under Alternative 4 would experience short-term air quality impacts from increased dust emissions and vehicle and equipment exhaust emissions from project development. These emissions could

violate air quality standards or exacerbate existing air quality violations and nonattainment conditions during short-term construction phases.

Impact AQ-2: Long-term operations air emissions would violate air quality standards or contribute to air quality violations.

All of the activities related to operation of renewable energy technologies and transmission would cause increased vehicle and equipment use with their associated exhaust emissions, dust emissions, and, for some projects, new stationary or portable emissions sources. Emissions from these sources could violate or contribute to existing violations of air quality standards. Examples of these activities and sources are listed in the Impact AQ-2 discussion for the No Action Alternative in Section IV.2.3.1.1.1.

All of the renewable energy technologies would require some operations and maintenance activities, creating new sources of dust emissions and combustion by-products from fossil-fueled sources. Because these activities would occur within both state and federal nonattainment areas, emissions from operations and maintenance would exacerbate nonattainment conditions.

Impact AQ-3: Operations would expose air quality–sensitive receptors to adverse air pollutant concentrations.

The development of renewable energy technologies and transmission would result in exhaust emissions from vehicles and equipment, dust emissions from activity on unpaved surfaces, and, in some cases, from new stationary or portable sources of emissions. Depending on the development sites, new emissions sources could be close enough to sensitive receptors to expose them to adverse air pollutant concentrations under Alternative 4.

The areas available for renewable energy development under Alternative 4 surround multiple cities with residences, hospitals, and schools including: Tehachapi, California City, Lancaster, Adelanto, Victorville, Barstow, Blythe, Calipatria, and Calexico. Because the specific renewable energy project sites are not yet known, sensitive receptors could experience adverse air pollutant concentrations under Alternative 4.

Impact AQ-4: Operations would conflict with or obstruct implementation of applicable air quality plans.

All of the activities related to development and operation of renewable energy technologies and transmission would cause project-related emissions that could conflict with applicable local air quality plans in nonattainment areas if projects do not fully implement the control strategies in those plans.

Impact AQ-5: Operations would create objectionable odors affecting a substantial number of people.

Geothermal technology may result in objectionable odors. Under Alternative 4, geothermal technology is planned within DFAs in the Owens River Valley, West Mojave and Eastern Slopes, Mojave and Silurian Valley, and the Imperial Borrego Valley ecoregion subareas. Because a substantial number of people live in these areas, geothermal development could create adverse air quality impacts for people within one mile of the odor sources. Although routine operations of geothermal facilities would include applicable odor controls, air quality impacts could still occur from operations, accidental releases, or upset conditions.

Impacts on Variance Process Lands

Variance Process Lands are neither conservation lands nor DFAs. They are a subset of the variance lands identified in the Solar PEIS ROD and additional lands that, based on current information, have moderate to low ecological value and ambiguous potential for renewable energy development. If renewable energy development occurs on Variance Process Lands, LUPA would not be required, so the environmental review process would be simpler than if the location were left as undesignated.

Variance Process Lands for each alternative are as shown in Chapter IV.1, Table IV.1-2 and in Volume II, Chapter II.7, Figure II.7-1 for Alternative 4. Development of the Variance Process Lands would have similar air quality effects as described under Impacts AQ-1 through AQ-5.

Impact Reduction Strategies and Mitigation

The implementation of the Proposed LUPA would result in the conservation of some desert lands as well as the development of renewable energy generation and transmission facilities in other lands. There are two ways in which the impacts of the renewable energy development covered by the Proposed LUPA would be lessened. First, the Proposed LUPA incorporates CMAs for each alternative, including specific biological conservation designation components and LUPA components. Second, the implementation of existing laws, orders, regulations and standards would reduce the impacts of project development.

Design Features of the Solar PEIS

The Solar PEIS design features for minimizing emissions described for the No Action Alternative (Section IV.2.3.1.1) would reduce the air quality impacts of this alternative.

Conservation and Management Actions

The conservation strategy for Alternative 4 (presented in Volume II, Section II.7.4) defines specific actions that would reduce the impacts of this alternative. The conservation strategy includes definitions of conservation designations and specific CMAs for the Preferred Alternative (see Section IV.2.3.2.1 for a list of CMAs).

Laws and Regulations

Similar to the No Action Alternative, existing laws and regulations will reduce certain impacts of project development. Relevant regulations are presented in the Regulatory Setting in Volume III. The requirements of relevant laws and regulations are summarized for the No Action Alternative in Section IV.2.3.1.1.1.

IV.2.3.6.2 Impacts of Conservation Designations

Alternative 4 would provide more than 4.4 million additional acres within the DRECP area with protective land designations. Establishing lands with protective designations would restrict development and its potential for air quality impacts.

Because the BLM LUPA land designations protect ecological, historical, cultural, scenic, scientific, and recreational resources and values, the creation of air quality impacts would be limited. Land uses within these areas are only allowed if they are compatible with the resources and values that the land designation is intended to protect. Impacts to air quality are therefore not likely from changes to BLM land designations.

IV.2.3.6.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside of the DRECP area on air quality would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.2.3.1.5.1.

IV.2.3.6.4 Comparison of Alternative 4 With Preferred Alternative

Alternative 4 results in long-term impacts from construction dust from ground disturbance and exhaust emissions from construction equipment and vehicles. Alternative 4 would result in less disturbance of BLM land compared with the Preferred Alternative.

Alternative 4 covers the same air basins as the Preferred Alternative, so state and federal air quality standards are the same as those described in Section IV.2.3.1.1.1. The air basins with renewable energy development under Alternative 4 that are within state and federal

nonattainment areas would experience similar impacts from development. The mitigation measures would be the same for Alternative 4 and the Preferred Alternative.

Alternative 4 would not have development activities near Twentynine Palms, similar to the Preferred Alternative; sensitive receptors would therefore not be exposed to substantial pollutant concentrations in this location under either alternative. Alternative 4 would not have development activities near Brawley, Holtville, Imperial, or El Centro, while the Preferred Alternative could. Sensitive receptors would not be exposed in these locations under Alternative 4.

Alternative 4 would create more emissions from ground disturbance and other development activities in the Cadiz Valley and Chocolate Mountains, Mojave and Silurian Valley, Owens River Valley, Panamint Death Valley, and West Mojave Eastern Slopes ecoregion subareas than would the Preferred Alternative.

The BLM LUPA would not affect existing BLM guidance on air quality but would change the pattern of development. Compared with the Preferred Alternative, Alternative 4 could result in less development, and therefore fewer air emissions, on BLM lands.

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IV.3 METEOROLOGY AND CLIMATE CHANGE

IV.3.1 Approach to Impact Analysis

This chapter addresses the potential for the proposed Desert Renewable Energy Conservation Plan (DRECP) Land Use Plan Amendment (LUPA) alternatives to increase or decrease cumulative levels of greenhouse gas (GHG) emissions after renewable energy facilities and associated transmission facilities are built out to be on line by 2040. This analysis also addresses how the alternatives relate to the emissions reduction targets identified in the California Global Warming Solutions Act and in California's Climate Change Scoping Plan.

This impact analysis considers broad activities, not site-specific issues associated with particular projects. Project- or location-specific factors that vary considerably from site to site cannot feasibly be analyzed in a programmatic document on this scale. No single activity or source of GHG emissions is large enough to trigger global climate change on its own. Because climate change is the result of the individual contributions of countless past, present, and future sources, GHG impacts are inherently cumulative. The cumulative impact analyses for the alternatives include GHG impacts from construction, operations, and decommissioning activities, as well as GHG reductions from the operation of the planned renewable energy projects. Project-specific impacts will be assessed both during the permitting process and in supplemental National Environmental Policy Act (NEPA) documents.

The following metrics are used to assess impact in this analysis:

- The number of megawatt-hours (MWh) likely to be produced under each alternative built out by 2040.
- The loss of carbon uptake from vegetation removed as a result of ground disturbance under each alternative.

These metrics provide a basis for comparison for the benefits and impacts under each alternative. The MWh metric indicates the effectiveness of the Proposed LUPA in producing electricity from renewable resources, and the ground disturbance metric indicates how Proposed LUPA activities influence development of the resources.

Climate change adaptation strategies and vegetation restoration are addressed in Chapter IV.7, Biological Resources. Appendix P illustrates the climate setting and how climate change science pertains to the DRECP landscape and the adaptive management framework.

The impact analysis considers whether the proposed DRECP would conflict with any applicable plans, policies, or regulations adopted for the purpose of reducing GHG

emissions. The California Global Warming Solutions Act and the Climate Change Scoping Plan make up the basis for the most relevant and applicable GHG reduction programs. These are described in Volume III, Chapter III.3, Regulatory Setting. The California Global Warming Solutions Act established GHG emissions reduction targets for the state and required developing a plan that would outline the strategies to achieve these targets. Expanding the use of renewable energy in California is an important part of California's approach to GHG reduction.

The state Climate Change Scoping Plan includes several measures to reduce GHG emissions from the energy sector (electricity production), including mandates for utility providers to increase their renewable energy mix to 33% by 2020. This means that 33% of the electricity provided by a utility must be produced from renewable energy sources. The intent of this measure, called the Renewable Portfolio Standard (RPS), is to transition away from dependence on fossil fuels and out-of-state fossil-fuel fired energy sources.

IV.3.2 Typical Impacts Common to All Action Alternatives

Development of solar, distributed generation, wind, and geothermal renewable energy sources generates relatively low levels of GHG emissions from construction, operations, and decommissioning activities (see Appendix R1.3-1 for examples of GHG emission rates for existing projects in the LUPA Decision Area).

The typical impacts from the various renewable energy and transmission technologies on Bureau of Land Management (BLM) lands would be the same as those described in Section IV.3.2.1. However, the specific locations where energy and transmission development will be allowed will be driven by LUPA decisions, which may encourage or restrict development in some areas.

The GHG emissions from construction and operations activities result from fossil-fuel combustion in the engines of construction equipment, vehicles carrying construction materials and workers, and vehicles necessary to provide maintenance, site security, and other operating functions. Carbon dioxide (CO_2) emissions account for the majority of GHG emissions from motor vehicles and equipment used during construction and operation and are directly related to the quantity of fuel combusted.

For complete development of a renewable energy site, typical levels of GHG emissions from construction, operation, and maintenance can be estimated based on the documented levels of emissions associated with existing renewable energy projects in the DRECP area (See Volume III, Section III.3.3.1, and Appendix R1.3-1). Environmental documents for the existing renewable energy projects in the DRECP area forecast levels of total GHG emission rates for project construction activities plus typical year-to-year operations activities.

These project-specific GHG emissions occur at greater levels at sites where greater electrical generating capacity is installed. As described in Volume III, Section III.3.3.1, GHG emissions typically occur at a rate ranging from about 1 to 39 metric ton CO_2 equivalent ($MTCO_2E$) per year for each megawatt (MW) of generation capacity installed. Typically, the complete development of a site causes an average rate of less than 10 $MTCO_2E$ per year for each MW of capacity installed. These factors indicate that complete development of up to 2,500 MW of capacity installed would be likely to create GHG emissions below the 25,000 MTCO2e annual level warranting quantitative disclosure, according to December 2014 CEQ Revised Draft NEPA Guidance for GHG Emissions and Climate Change Impacts.

As described in the Draft DRECP and EIR/EIS, the Renewable Energy Action Team (REAT) agencies anticipate that renewable generation projects of approximately 20,000 MW could be located within the DRECP area under all alternatives. The level of generation that would be located on BLM-managed land varies among alternatives, as follows:

- 9,792 MW on BLM land in the No Action Alternative.
- 8,175 MW in the Preferred Alternative.
- 3,042 MW in Alternative 1.
- 10,726 MW in Alternative 2.
- 6,376 MW in Alternative 3.
- 7,094 MW in Alternative 4.

The amount of electricity produced annually from renewable resources installed on BLM-managed land would also vary among alternatives, as follows:

- 22.1 million MWh produced on BLM land in the No Action Alternative.
- 22.8 million MWh in the Preferred Alternative.
- 9.3 million MWh in Alternative 1.
- 30.0 million MWh in Alternative 2.
- 18.1 million MWh in Alternative 3.
- 19.4 million MWh in Alternative 4.

Along with the GHG emissions caused by project construction activities and operations activities such as maintenance and inspection, development of renewable energy affects the natural carbon uptake of vegetation lost through land use conversion. Other one-time (life-cycle) events such as manufacturing, transport, and ultimately disposal of project components also cause GHG emissions.

Indirect GHG emissions reductions would occur because of the electricity provided by each renewable energy project. As discussed here, because developing new renewable energy sources would reduce, displace, or eliminate the emissions that otherwise result from fossil fuel-fired power plants, the avoided GHG emissions typically greatly exceed the levels of emissions directly caused from developing the project.

IV.3.2.1 Impacts of Renewable Energy and Transmission Development

The GHG emissions impacts from solar, wind, geothermal, and transmission differ depending on the individual technology deployed. All of the renewable energy technologies would generate GHG emissions from activities necessary for site characterization and testing, employee commuting, construction, operations, and decommissioning. Development of the land also results in lost capacity of soil and vegetation to sequester carbon at the sites. However, this impact is offset by reducing emissions associated with producing electricity through the use of carbon-based fuels.

Electricity production by fossil fuel-fired California and western U.S. power plants under baseline conditions causes approximately 20% of California's overall GHG inventory. Producing electricity through renewable energy technologies avoids conventional power plant emissions that occur when serving the California load. These substantial GHG emissions reductions would be indirect, because while each renewable energy project would enable a reduction, the renewable energy project is not in control of those reductions. To serve any given load, these GHG reductions are attributable to using the renewable resources.

IV.3.2.1.1 Impacts of Site Characterization

Typical site characterization activities include construction of temporary access roads, site reconnaissance, geotechnical borings, and the construction of meteorological towers. These impacts are similar for each renewable energy technology. The emissions from site characterization would come from fossil-fuel combustion in the engines of the equipment and vehicles used during construction or decommissioning. In-depth lists of activities are located in Volume II, Section II.3.3.1.

IV.3.2.1.2 Impacts of Construction and Decommissioning

The typical GHG emissions impacts from construction and decommissioning activities result from fossil-fuel combustion in the engines of construction equipment and the vehicles carrying construction materials and workers to each development site. Diesel fuel or gasoline is used in mobilizing the heavy-duty construction equipment, site development and preparation, facility removal, building construction, and roadway construction; the nature of the GHG emissions from these types of activities would be

similar regardless of the renewable energy technology. The GHG emissions from decommissioning are similar to those that occur during construction. Because CO_2 has an atmospheric lifetime of from 50 to 200 years, assessing the impacts of limited-duration construction-phase GHG emissions usually involves averaging or amortizing the total emissions created by the construction effort over each project's expected operating life. In-depth lists of activities are located in Volume II, Section II.3.3.1.

Land use conversion brought about by the development of renewable energy and the vegetation removal that occurs with ground disturbance may reduce the rate of natural carbon uptake into soils and vegetation (carbon sequestration). Soils and plants on each development site currently provide a natural carbon sink (storage capacity). By developing the land, some but not all of the natural carbon sequestration provided by the existing soils and vegetation would be eliminated. Vegetation management and restoration practices during project operation can partially restore the natural removal of CO_2 from the atmosphere that would otherwise be lost through construction-related ground disturbance.

IV.3.2.1.3 Impacts of Operations and Maintenance

The GHG emissions occurring during operation and maintenance of each renewable energy project result from the fossil-fuel combustion used for routine upkeep of the project site, security, emergency generators, employee commuting trips, and vegetation removal. Sources of GHG emissions occur with access and spur road maintenance, combustion of natural gas for solar thermal technologies, facilities maintenance, geothermal well drilling, well venting, and steam turbine operations, among other activities. Sulfur hexafluoride (SF_6) is used as an insulating gas in electric power transmission and distribution equipment.

Solar thermal projects could additionally involve combustion of natural gas and therefore are expected to result in GHG emissions impacts during operations. Geothermal technologies would result in additional emissions of CO_2 and methane (CH_4) naturally present in geothermal steam emitted during well venting and steam turbine operations.

In-depth lists of operations and maintenance activities are presented in Volume II, Section II.3.3.1.

IV.3.2.2 Impacts of the Ecological and Cultural Conservation and Recreation Designations

In general, the conservation designations would define large areas where development would be very limited or prohibited. Construction activities would be limited, and new vehicle emissions would be at very low levels. In areas with no development, there would be no removal of vegetation, so the natural carbon uptake of existing plants would continue

or be enhanced through restoration design, which has optimization of carbon sequestration as one goal. Restoration of plants is discussed in Chapter IV.7, Biological Resources.

The BLM LUPA land designations define management approaches that protect ecological, historic, cultural, scenic, scientific, and recreation resources and values. They would not have an effect on GHG emissions, except for controls on emissions-generating projects.

Details on allowable uses and management within National Conservation Lands are presented in the Proposed LUPA description in Volume II. Details on the goals, objectives, allowable uses, and management actions for each Area of Critical Environmental Concern (ACEC) and Special Recreation Management Area (SRMA) unit are presented in the LUPA worksheets in Appendix H.

IV.3.3 Impact Analysis by Alternative

The following sections present impact analysis on GHG emissions for the No Action Alternative, the Preferred Alternative, and Alternatives 1 through 4.

IV.3.3.1 No Action Alternative

IV.3.3.1.1 Impacts of Renewable Energy and Transmission Development

The No Action Alternative assumes the state's renewable energy goals would be achieved absent the DRECP and that renewable energy, transmission development, and mitigation for such projects in the DRECP area would occur on a project-by-project basis consistent with past and ongoing renewable energy and transmission projects.

Under the No Action Alternative, the existing land management plans within the DRECP area (California Desert Conservation Area [CDCA) Plan as amended, Caliente Resource Management Plan [RMP], and Bishop RMP) would continue to be implemented on BLM lands. As GHGs are not confined to specific boundaries, they would not interact any differently with ACECs and within Solar Energy Zones (SEZs) and Variance Process Lands.

As described in the Draft DRECP and EIR/EIS, the REAT agencies anticipate that renewable generation projects of approximately 20,000 MW could be located within the DRECP area under all alternatives. This level of generation includes 9,800 MW that would be located on BLM-managed lands in the No Action Alternative. The No Action Alternative assumes a mix of technologies on BLM land producing 22.1 million MWh annually and on line by 2040.

Impact MC-1: Construction or operation of Plan components would generate GHG emissions.

All development of renewable energy technologies and transmission would result in GHG emissions from activities listed previously (see Section IV.3.2), including construction, operations and maintenance, and decommissioning. Emissions for the 2040 horizon are considered here, although year-to-year rates would vary as renewable energy facilities and associated transmission capacities are built out to be on line by 2040. Separate discussions appear for the GHG emissions caused by construction activities, operations activities such as maintenance and inspection, the effects of land use conversion, and indirect GHG emissions reductions from the energy output provided by the renewable energy technologies.

Emissions From Development Activities: Construction, Operations, and Decommissioning. Examples of the typical levels of GHG emissions produced from developing individual renewable energy projects are listed in Appendix R1.3-1 These levels of emissions are indicative of those that would result from development of projects expected under the No Action Alternative.

Projects developed under the No Action Alternative are anticipated to achieve a combined capacity of approximately 20,000 MW by the time they are built out by 2040 with 9,800 MW on BLM land. Based on the existing projects in the DRECP area, construction emissions plus operations emissions during the life of each project would occur at an average rate of less than 10 $MTCO_2E$ per year for each MW of capacity (see Section III.3.3.1 and Appendix R1.3-1). Development activities to install approximately 20,000 MW through a variety of individual projects across the entire DRECP area would therefore result in GHG emissions at the rate of approximately 200,000 $MTCO_2E$ per year or approximately 98,000 $MTCO_2E$ per year on BLM-managed lands.

Emissions Related to Land Use Conversion. There are 9,781,700 acres of land within the DRECP area that would be available for development under the No Action Alternative. As defined in Volume II, the No Action Alternative would result in 122,000 acres of long-term disturbance due to construction and operation of renewable generation facilities across the entire DRECP area and 61,500 acres on BLM land. Development of transmission would disturb additional areas. This ground disturbance is assumed to remove vegetation that naturally provides carbon uptake. Converting the existing lands would eliminate the natural sequestration of carbon because the existing vegetation acts as a sink by removing CO_2 from the atmosphere. As described under typical impacts, ground disturbance and vegetation removal during construction of renewable energy facilities would add to the GHG impact because vegetation would no longer be present to sequester CO_2. The loss of carbon uptake depends on what fraction

of natural vegetation on each site would be cleared for permanent installation of foundations or other structures, and on efforts to minimize soil erosion or protect existing habitat to minimize the loss of carbon uptake.

The loss of vegetation due to ground disturbance in the No Action Alternative would reduce the rate of carbon uptake. The actual amount of this loss is uncertain because it would depend on each particular development site, and data on rates of sequestration by vegetation and soils are approximations. This loss of carbon uptake could range from 178,000 $MTCO_2E$ to 630,000 $MTCO_2E$ per year across the entire DRECP area and from 74,400 $MTCO_2E$ to 217,100 $MTCO_2E$ per year on BLM-managed lands (see Table IV.3-1).

Table IV.3-1
Estimated Loss of Annual Carbon Uptake – No Action Alternative

Alternative	Permanent Disturbance (acres)	Carbon Sequestered ($MTCO_2E$), Low Est.[1]	Carbon Sequestered ($MTCO_2E$), High Est.[2]
No Action Alternative (Total BLM Portion)	61,500	-74,400	-217,100

[1] Estimate for "average U.S. forests," including desert scrub environments. Desert scrub sequesters less carbon than other U.S. forest categories. http://www.epa.gov/cleanenergy/energy-resources/refs.html#pineforests.

[2] Estimate for "grasslands," as reported by the California Climate Action Registry and the California Emissions Estimator Model, which is a category that includes shrub communities that fall below the threshold values used in the forest land category (http://www.caleemod.com, Appendix A).

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Emissions Avoided by Producing Electricity. The use of renewable power would displace power produced by carbon-based fuels that would otherwise be used to meet electricity demand. The power displaced is incremental power provided by generators, typically from natural gas power plants. The California Public Utilities Commission (CPUC) has stated that, by 2020, the marginal power plant will be a new combined-cycle combustion turbine 95% of the time or a new combustion turbine 5% of the time. Based on this ratio, the GHG emissions associated with marginal power production are 830 pounds CO_2E per MWh (Air Resources Board [ARB] 2010). The Environmental Protection Agency (EPA) estimates the baseline GHG emissions of marginal power to be more than 990 pounds CO_2E per MWh for California (see Table III.3-3).

Absent the emissions directly caused by construction, operations, and decommissioning, the GHG emissions that would be avoided or displaced as a result of new solar and wind renewable electricity production are expected to be approximately 830 pounds CO_2E per

MWh (see Section III.3.3.2). GHG emissions displaced by geothermal energy would be approximately 520 pounds CO_2E per MWh, which accounts for the CO_2 that occurs naturally in geothermal steam released by operations at a geothermal plant, which averages 310 pounds CO_2E per MWh (ARB 2010). Methane may also be naturally present in the steam. As seen for the existing renewable energy projects in the DRECP area (see Volume III, Section III.3.3.1, and Appendix R1.3-1), the displaced annual GHG emissions exceed the total emissions calculated for construction, operations, and decommissioning, resulting in a GHG reduction.

These GHG emissions reductions for the No Action Alternative would be approximately 18,200,000 $MTCO_2E$ per year for the combined renewable energy technologies across the entire DRECP area and 8,265,000 $MTCO_2E$ for projects on BLM land (See Table IV.3-2). Because the GHG avoided from fossil fuel-fired power plants would greatly exceed GHG emissions generated by renewable energy development and land use conversion, the electricity produced under the No Action Alternative would reduce California's net GHG emissions.

Table IV.3-2
Annual GHG Emissions Reductions – No Action Alternative

Technology	Annual Production (MWh)	Avoided Emissions ($MTCO_2E$)
Solar[1]	18,623,300	7,011,000
Wind[1]	3,072,300	1,157,000
Geothermal[2]	412,720	97,000
Total	**22,108,320**	**8,265,000**

1 Emissions avoided/displaced for solar and wind energy are 830 pounds per MWh (ARB 2010).
2 Emissions avoided/displaced for geothermal energy are 520 pounds per MWh (ARB 2010).

Impact MC-2: Construction or operation of Plan components would conflict with an applicable plan, policy, or regulation intended to address climate change.

Projects developed under the No Action Alternative would support the state's GHG emissions reductions goals and plans by generating electricity from renewable energy resources instead of fossil-fuel resources. This displacement of GHGs would lower the GHG baseline emissions attributable to electricity use in California and would be consistent with the GHG reduction goals established by Executive Orders, the California Global Warming Solutions Act, and the Climate Change Scoping Plan (see Volume III, Section III.3.1.2).

Executive Order S-14-08 established the RPS goal of 33% by 2020 and directed the Renewable Energy Action Team to achieve certain goals related to the DRECP, including processes to facilitate RPS desert project approval. Development of renewable energy

facilities under the No Action Alternative would provide energy to retail sellers of electricity and partially enable California's utilities to comply with RPS requirements. However, the No Action Alternative would not include any long-term natural resource conservation strategies. The No Action Alternative would therefore conflict with Executive Order S-14-08, which addresses the need for renewable energy while conserving the natural resources of the desert. Aside from the conflict with Executive Order S-14-08, individual renewable energy projects under the No Action Alternative would not be expected to conflict with any other applicable plan, policy, or regulation adopted for purposes of reducing GHG emissions.

Laws and Regulations

Existing laws and regulations provide a framework to reduce statewide GHG emissions and baseline conditions (including projected conditions) for the DRECP area and subsequent renewable energy projects. Additionally, some of the following regulations provide direction for project-level measures designed to reduce GHG emissions and impacts:

- Executive Order S-3-05, signed by Governor Arnold Schwarzenegger on June 1, 2005, and Executive Order B-30-15 signed by Governor Edmund G. Brown Jr. on April 29, 2015, established GHG emissions reduction targets for the state of California and directed the California Environmental Protection Agency to oversee efforts to reach these targets.
- AB 32 (Nunez), the California Global Warming Solutions Act of 2006, requires that the California Air Resources Board (CARB) adopt rules and regulations to reduce GHG emissions to 1990 levels by 2020. The CARB is required to publish a list of discrete GHG emissions reduction measures.
- The RPS promotes diversification of the state's electricity supply, and Executive Orders S-14-08 and S-21-09 established the goal that, by 2020, 33% of the electricity provided by a utility must be produced from renewable energy sources in a manner that considers conservation of California's desert natural resources.
- The Greenhouse Gases Emission Performance Standard (SB 1368) requires California utilities to satisfy a per-MWh performance threshold when making new investments in power plants. Baseload generation owned by, or under long-term contract to, California utilities must not exceed 1,100 pounds CO_2 per MWh (0.5 MT per MWh).
- CARB adopted SF_6 regulations (17 California Code of Regulations [CCR] 95350) to reduce SF_6 emissions from electric power system gas-insulated switchgear. The regulations require owners of such switchgear to (1) annually report their SF_6 emissions, (2) determine the emission rate relative to the SF_6 capacity of the switchgear, (3) provide a complete inventory of all gas-insulated switchgear and

their SF_6 capacities, (4) produce a SF_6 gas container inventory, and (5) keep all information current for CARB enforcement staff inspection and verification. Transmission projects and switchgear associated with the renewable energy development projects would be subject to this regulation.

Design Features of the Solar PEIS

The Solar Programmatic EIS (PEIS) does not include any design features for the specific purposes of reducing GHG or avoiding potential impacts due to climate change.

Typical Mitigation Measures

The types of mitigation available to reduce GHG focus on either avoiding or offsetting emissions from fossil fuels used during construction and controlling SF_6 emissions from electrical switchgear. Following are the typical mitigation measures that would likely be implemented under the No Action Alternative. These strategies could be used, where necessary, to reduce GHG (as defined in Impact MC-1) under the No Action Alternative.

- Use electric vehicles, biodiesel, or alternative fuels during construction and operations phases to reduce the project's emissions of criteria pollutants and GHG.
- Reduce SF_6 emissions and losses through a comprehensive strategy that includes the following actions: Develop and maintain a record of SF_6 purchases, an SF_6 leak detection and repair program using laser imaging leak detection and monitoring no less frequently than quarterly, an SF_6 recycling program, and an employee education and training program for avoiding or eliminating SF_6 emissions caused by gas-insulated switchgear.
- Offset construction-phase emissions by surrendering carbon credits backed by voluntary GHG emissions reductions to fully offset construction-phase GHG emissions.

IV.3.3.1.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

The No Action Alternative has no new conservation designations, but without approval of an action alternative, there would be continued protection of existing approximately 2.4 million acres of conservation lands such as wilderness areas. In addition, under the No Action Alternative, renewable energy projects would continue to be evaluated and approved with project-specific mitigation requirements.

IV.3.3.1.3 Impacts of Transmission Outside the DRECP Area

New transmission lines would be required to deliver electricity from renewable energy projects in the DRECP area to high-demand urban areas. The corridors for

transmission lines would be existing transmission corridors located outside the DRECP area in San Diego, Los Angeles, North Palm Springs–Riverside, and the Central Valley. Renewable energy projects produce electricity that avoids or displaces use of GHG-emitting power plants. These transmission lines would be part of that overall GHG displacement or avoidance.

Impact MC-1: Construction or operation of Plan components would generate GHG emissions.

Except for emissions involved in the use of vehicles and equipment during the construction and maintenance of the transmission lines and emissions of SF_6 that escape during its use as an insulating gas in switchgear, transmission facilities would not create GHG emissions. The GHG emissions during routine operation and maintenance of the transmission lines would occur at much lower levels than during construction, and the GHG emissions avoided as a result of avoiding operation of fossil fuel-fired power plants would greatly exceed the levels of emissions from transmission line construction and operations activities.

Impact MC-2: Construction or operation of Plan components would conflict with an applicable plan, policy, or regulation intended to address climate change.

While GHG emissions would result from transmission line construction and operation, the overall effect of developing renewable energy resources and the transmission facilities to deliver the electricity to customers would reduce GHG emissions. The transmission lines would be essential to achieving the RPS and the overall GHG reduction strategy for the state, as transmission lines are necessary to deliver renewable energy to load centers. Developing the transmission facilities would occur in a manner consistent with and would not conflict with the California Global Warming Solutions Act, GHG reduction goals, and the Climate Change Scoping Plan (see Volume III, Section III.3.1.2).

IV.3.3.2 Preferred Alternative

IV.3.3.2.1 Impacts of Renewable Energy and Transmission Development

The Preferred Alternative assumes that a mix of technologies on BLM land will produce 22.8 million MWh of electricity annually. The mix includes 8,175 MW of generation capacity on BLM land installed, built out, and on line by 2040.

Streamlining renewable energy development on BLM lands within the DFAs would not change the numeric calculations for Impacts MC-1 and MC-2, which are presented below. The range of loss of natural carbon uptake would remain the same, as would the MWh produced under the Preferred Alternative and the GHG emissions reductions. Streamlining

development may result in faster delivery of electricity to the grid, thereby achieving the GHG emissions reductions more quickly and maintaining consistency with the California Global Warming Solutions Act and the Climate Change Scoping Plan.

Impact MC-1: Construction or operation of Plan components would generate GHG emissions.

The activities associated with renewable energy technologies and transmission would result in construction, operations and maintenance, and decommissioning activities that create GHG emissions, as described for the No Action Alternative in Section IV.3.3.1.1. Emissions for the 2040 horizon appear here, although the year-to-year rates would vary as the renewable energy facilities and associated transmission capacity are to be on line by 2040. Separate discussions appear for the GHG emissions caused by construction and operations and maintenance activities, the effects of land use conversion, and the indirect GHG emissions reductions that would occur because of the energy output provided by the renewable energy facilities.

Emissions From Development Activities: Construction, Operations, and Decommissioning. Projects developed under the Preferred Alternative within the DRECP area would have a combined capacity of approximately 20,000 MW when built out by 2040. Based on the emissions caused by existing projects, construction emissions plus operations, emissions to develop this capacity across the entire DRECP area would cause GHG emissions at a rate of approximately 200,000 $MTCO_2E$ per year or approximately 81,750 $MTCO_2E$ per year on BLM-managed lands during the life of the Plan.

Emissions Related to Land Use Conversion. There would be 48,000 acres of ground disturbance and vegetation removal due to renewable energy generation under the Preferred Alternative on BLM land. Development of transmission would disturb additional areas. Vegetation removal results in a loss of natural carbon uptake. Based on this loss of vegetation, the Preferred Alternative would reduce the rate of carbon uptake. The actual amount of this loss is uncertain because it would depend on each particular development site, and data on rates of sequestration by vegetation and soils are approximations (see Table IV.3-3).

Table IV.3-3
Estimated Loss of Annual Carbon Uptake – Preferred Alternative

Alternative	Permanent Disturbance (acres)	Carbon Sequestered ($MTCO_2E$) Low Est.[1]	Carbon Sequestered ($MTCO_2E$) High Est.[2]
Preferred Alternative (Total BLM Portion)	48,419	-58,600	-170,900

[1] Estimate for "average U.S. forests," including desert scrub environments. Desert scrub sequesters less carbon than other U.S. forest categories. http://www.epa.gov/cleanenergy/energy-resources/refs.html#pineforests.

[2] Estimate for "grasslands," as reported by the California Climate Action Registry and the California Emissions Estimator Model, which is a category that includes shrub communities that fall below the threshold values used in the forest land category (http://www.caleemod.com, Appendix A).

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

Emissions Avoided by Producing Electricity. The GHG emissions reductions for the Preferred Alternative would occur at the same displacement rates as described for the No Action Alternative in Section IV.3.3.1.1. The GHG emissions reductions for the Preferred Alternative would be approximately 7.6 million $MTCO_2E$ per year for the combined renewable energy technologies on BLM land (see Table IV.3-4). Because the GHG avoided from fossil fuel-fired power plants would greatly exceed the GHG emissions caused by renewable energy development activities and land use conversion, the electricity produced under the Preferred Alternative would reduce California's GHG emissions.

Table IV.3-4
Annual GHG Emissions Reductions – Preferred Alternative

Technology	Annual Production (MWh)	Avoided Emissions ($MTCO_2E$)
Solar[1]	11,617,783	4,374,000
Wind[1]	4,120,729	1,551,000
Geothermal[2]	7,030,984	1,658,000
Total	**22,769,497**	**7,583,000**

[1] Emissions avoided/displaced for solar and wind energy are 830 pounds per MWh (ARB 2010).
[2] Emissions avoided/displaced for geothermal energy are 520 pounds per MWh (ARB 2010).

Impact MC-2: Construction or operation of Plan components would conflict with an applicable plan, policy, or regulation intended to address climate change.

Projects developed under the Preferred Alternative would support the state's GHG emissions reductions goals and plans by generating electricity from renewable energy resources instead of fossil-fuel resources. This displacement of GHGs would be consistent with the California Global Warming Solutions Act, GHG reduction goals, and the Climate Change Scoping Plan (see Volume III, Section III.3.1.2). Additionally, the Preferred Alternative would address the need for renewable energy while establishing strategies for conservation of California's desert natural resources in a manner consistent with Executive Order S-14-08. Individual renewable energy projects would cause no other potential conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

Impacts on Variance Process Lands

Variance Process Lands are neither conservation designations nor DFAs. They are a subset of the variance lands identified in the Solar PEIS ROD and additional lands that, based on current information, have moderate to low ecological value and ambiguous value for renewable energy. If renewable energy development occurs on Variance Process Lands, a LUPA would not be required, so the environmental review process would be somewhat simpler than if the location were left undesignated.

Variance Process Lands for each alternative are as shown in Chapter IV.1, Table IV.1-2 and in Volume II, Chapter II.3, Figure II.3-1 for the Preferred Alternative. Development of the Variance Process Lands would have similar air quality effects as described under Impacts MC-1 and MC-2.

Impact Reduction Strategies

The implementation of the Proposed LUPA would result in conservation of some desert lands as well as the development of renewable energy generation and transmission facilities on other lands. The impacts of the renewable energy development covered by the Proposed LUPA would be lessened in two ways. First, it incorporates Conservation and Management Actions (CMAs) for each alternative, including specific biological conservation designation components and LUPA components. Second, the implementation of existing laws, orders, regulations, and standards would reduce the impacts of project development.

Design Features of the Solar PEIS

The Solar Programmatic EIS (PEIS) does not include any design features for the specific purposes of reducing GHG or avoiding potential impacts due to climate change.

Conservation and Management Actions

The conservation strategy for the Preferred Alternative (presented in Volume II, Section II.3.4) defines specific actions that would reduce the impacts of this alternative. The conservation strategy defines the conservation designations and specific CMAs for the Preferred Alternative. One CMA for air resources (LUPA-AIR-3) specifically addresses GHG emissions as a necessary part of the impact analysis.

Laws and Regulations

Similar to the No Action Alternative, existing laws and regulations will reduce certain impacts of DRECP implementation. Relevant regulations are presented in the Regulatory

Setting in Chapter III.3. The requirements of relevant laws and regulations are summarized for the No Action Alternative in Section IV.3.3.1.1.

IV.3.3.2.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

The Preferred Alternative would provide about 5 million acres within the DRECP area with protective land designations. Establishing lands with protective designations provides GHG benefits because limiting development on the lands restricts the potential removal of vegetation, which would allow the natural carbon uptake of existing soils and vegetation to continue in these areas. Restoration of plants is discussed in Chapter IV.7, Biological Resources.

The BLM LUPA land designations protect ecological, historical, cultural, scenic, scientific, and recreational resources and values. While other land uses within these areas are allowed, they must be compatible with the resources and values that the land designation is intended to protect. GHG impacts are not likely from changes to BLM land designations.

IV.3.3.2.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside of the DRECP area on meteorology and climate change would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.3.3.1.3.

IV.3.3.2.4 Comparison of the Preferred Alternative With No Action Alternative

The Preferred Alternative would produce greater levels of electricity from renewable resources installed on BLM land compared with the No Action Alternative. Implementing the DRECP under the Preferred Alternative would develop the resources in a manner that would satisfy Executive Order S-14-08 to address the need for renewable energy. The Preferred Alternative would therefore avoid the potential conflict with Executive Order S-14-08 that would occur with the No Action Alternative.

The mix of technologies in the Preferred Alternative would result in more wind and geothermal generation capacity being installed on BLM land compared with the No Action Alternative (see Tables IV.3-2 and IV.3-4). When the avoided or displaced GHG emissions are calculated (see Section IV.3.3.1.1 for the rationale), the generation mix of the Preferred Alternative would provide fewer $MTCO_2E$ GHG emissions reductions per year. This means a lower level of GHG emissions would be reduced (i.e., displaced) under the Preferred Alternative than under the No Action Alternative.

Unlike the No Action Alternative, the Preferred Alternative would cause no potential conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

The BLM land designations and management actions would not change the calculations for Impacts MC-1 and MC-2 analyzed under the No Action Alternative and the Preferred Alternative. The range of loss of natural carbon uptake would remain the same, as would the MWh produced under both alternatives and the GHG emissions reduced.

The streamlined development under the Preferred Alternative may result in faster delivery of electricity to the grid than under the No Action Alternative, thereby achieving the GHG emissions reductions more quickly and maintaining consistency with the California Global Warming Solutions Act and the Climate Change Scoping Plan.

IV.3.3.3 Alternative 1

IV.3.3.3.1 Impacts of Renewable Energy and Transmission Development

Alternative 1 assumes that a mix of technologies on BLM land will produce 9.3 million MWh annually. The mix includes 3,042 MW of generation capacity on BLM land installed, built out, and on line by 2040.

Streamlining renewable energy development on BLM lands within the DFAs would not change the numeric calculations for Impacts MC-1 and MC-2. The range of loss of natural carbon uptake would remain the same, as would the MWh produced under Alternative 1 and the GHG emissions reductions. Streamlining development may result in faster delivery of electricity to the grid, thereby achieving the GHG emissions reductions more quickly and maintaining consistency with the California Global Warming Solutions Act and the Climate Change Scoping Plan.

Impact MC-1: Construction or operation of Plan components would generate GHG emissions.

The activities associated with renewable energy and transmission facilities would result in construction, operations and maintenance, and decommissioning activities, in turn resulting in GHG emissions as described for the No Action Alternative in Section IV.3.3.1.1. Emissions for the 2040 horizon appear here, although the year-to-year rates would vary as renewable energy and transmission facilities are to be on line by 2040. Separate discussions appear for the GHG emissions caused by construction and operations and maintenance activities, the effects of land use conversion, and the indirect GHG emissions reductions that would occur because of the energy output provided by the renewable energy technologies.

Emissions From Development Activities: Construction, Operations, and Decommissioning. Projects developed under Alternative 1 within the DRECP area are anticipated to have a combined capacity of approximately 20,000 MW when built out by 2040. Construction emissions plus operations emissions to develop this capacity across the entire DRECP area would cause GHG emissions at a rate of approximately 200,000 $MTCO_2E$ per year or approximately 30,420 $MTCO_2E$ per year on BLM-managed lands during the life of the DRECP.

Emissions Related to Land Use Conversion. There would be much less ground disturbance and vegetation removal on BLM land from renewable energy development under Alternative 1 than with the Preferred Alternative. Development of transmission would also disturb additional areas. Vegetation removal results in a loss of natural carbon uptake, although the actual amount of this loss is uncertain because it would depend on each particular development site, and data on rates of sequestration by vegetation and soils are approximations (see Table IV.3-5).

Table IV.3-5
Estimated Loss of Annual Carbon Uptake – Alternative 1

Alternative	Permanent Disturbance (acres)	Carbon Sequestered ($MTCO_2E$), Low Est.[1]	Carbon Sequestered ($MTCO_2E$), High Est.[2]
Alternative 1 (Total BLM Portion)	18,436	-22,300	-65,100

[1] Estimate for "average U.S. forests," including desert scrub environments. Desert scrub sequesters less carbon than other U.S. forest categories. http://www.epa.gov/cleanenergy/energy-resources/refs.html#pineforests.

[2] Estimate for "grasslands," as reported by the California Climate Action Registry and the California Emissions Estimator Model, which is a category that includes shrub communities that fall below the threshold values used in the forest land category (http://www.caleemod.com, Appendix A).

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Emissions Avoided by Producing Electricity. The GHG emissions reductions for Alternative 1 would occur at the same displacement rates described for the No Action Alternative in Section IV.3.3.1.1. These GHG emissions reductions for Alternative 1 would be approximately 2.8 million $MTCO_2E$ per year for the combined renewable energy technologies on BLM land (see Table IV.3-6). Because the GHG avoided from fossil fuel-fired power plants would greatly exceed the GHG emissions caused by renewable energy development activities and land use conversion, the electricity produced under Alternative 1 would reduce California's GHG emissions.

Table IV.3-6
Annual GHG Emissions Reductions – Alternative 1

Technology	Annual Production (MWh)	Avoided Emissions ($MTCO_2E$)
Solar[1]	4,481,090	1,687,000
Wind[1]	158,427	60,000
Geothermal[2]	4,662,817	1,100,000
Total	**9,302,335**	**2,847,000**

1 Emissions avoided/displaced for solar and wind energy are 830 pounds per MWh (ARB 2010).
2 Emissions avoided/displaced for geothermal energy are 520 pounds per MWh (ARB 2010).

Impact MC-2: Construction or operation of Plan components would conflict with an applicable plan, policy, or regulation intended to address climate change.

Projects developed under Alternative 1 would support the state's GHG emissions reductions goals and plans by generating electricity from renewable energy resources instead of fossil-fuel resources. This displacement of GHGs would be consistent with the California Global Warming Solutions Act, GHG reduction goals, and the Climate Change Scoping Plan (see Volume III, Section III.3.1.2). Individual renewable energy projects would cause no potential conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

Impacts on Variance Process Lands

Variance Process Lands are neither conservation lands nor DFAs. They are a subset of the variance lands identified in the Solar PEIS ROD and additional lands that, based on current information, have moderate to low ecological value and ambiguous value for renewable energy. If renewable energy development occurs on Variance Process Lands, a LUPA would not be required, so the environmental review process would be somewhat simpler than if the location were left undesignated.

Variance Process Lands for each alternative are as shown in Chapter IV.1, Table IV.1-2 and in Volume II, Chapter II.4, Figure II.4-1 for Alternative 1. Development of the Variance Process Lands would have similar air quality effects as described under Impacts MC-1 and MC-2.

Impact Reduction Strategies

The implementation of the Proposed LUPA would result in conservation of some desert lands as well as the development of renewable energy generation and transmission facilities on other lands. The impacts of the renewable energy development covered by the

Proposed LUPA would be lessened in two ways. First, it would incorporate CMAs for each alternative, including specific biological conservation designation components and LUPA components. Second, the implementation of existing laws, orders, regulations, and standards would reduce the impacts of project development.

Design Features of the Solar PEIS

The Solar Programmatic EIS (PEIS) does not include any design features for the specific purposes of reducing GHG or avoiding potential impacts due to climate change.

Conservation and Management Actions

The conservation strategy for Alternative 1 (presented in Volume II, Section II.4.4) defines specific actions that would reduce the impacts of this alternative. The conservation strategy defines the conservation designations and specific CMAs for the Preferred Alternative.

Laws and Regulations

Similar to the No Action Alternative, existing laws and regulations will reduce certain impacts of Plan implementation. Relevant regulations are presented in the Regulatory Setting in Chapter III.3. The requirements of relevant laws and regulations are summarized for the No Action Alternative in Section IV.3.3.1.1.

IV.3.3.3.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

Alternative 1 would result in about 4.9 million acres within the DRECP area with protective land designations. Establishing lands with protective designations provides GHG benefits because limiting development on the lands restricts the potential removal of vegetation, which would allow the natural carbon uptake of existing soils and vegetation to continue in these areas.

The BLM LUPA land designations protect ecological, historical, cultural, scenic, scientific, and recreational resources and values. While other land uses within these areas are allowed, they must be compatible with the resources and values that the land designation is intended to protect. Establishing lands with protective designations provides GHG benefits.

IV.3.3.3.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside of the DRECP area on meteorology and climate change would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.3.3.1.3.

IV.3.3.3.4 Comparison of Alternative 1 With the Preferred Alternative

Alternative 1 would produce lower levels of electricity from renewable resources installed on BLM land compared with the Preferred Alternative.

The mix of technologies in Alternative 1 would result in much less renewable generation capacity being installed on BLM land compared with the Preferred Alternative (see Tables IV.3-4 and IV.3-6). When the avoided or displaced GHG emissions are calculated (see Section IV.3.3.1.1 for the rationale), the generation mix of Alternative 1 would displace fewer (nearly 4.8 million $MTCO_2E$ less) GHG emissions per year, which means a lower level of GHG emissions would be reduced (i.e., displaced) under Alternative 1 than under the Preferred Alternative.

The BLM land designations and management actions would not change the calculations for Impacts MC-1 and MC-2 as analyzed under Alternative 1 and the Preferred Alternative. The range of loss of natural carbon uptake would remain the same, as would the MWh produced under both alternatives and the GHG emissions reduced. The streamlined development is anticipated to occur under both of the alternatives.

IV.3.3.4 Alternative 2

IV.3.3.4.1 Impacts of Renewable Energy and Transmission Development

Alternative 2 assumes that a mix of technologies on BLM land will produce 30 million MWh annually. The mix includes 10,726 MW of generation capacity on BLM land installed, built out, and on line by 2040.

Streamlining renewable energy development on BLM lands within the DFAs would not change the numeric calculations for Impacts MC-1 and MC-2. The range of loss of natural carbon uptake would remain the same, as would the MWh produced under Alternative 2 and the GHG emissions reductions. Streamlining development may result in faster delivery of electricity to the grid, thereby achieving the GHG emissions reductions more quickly and maintaining consistency with the California Global Warming Solutions Act and the Climate Change Scoping Plan.

Impact MC-1: Construction or operation of Plan components would generate GHG emissions.

Activities related to the renewable energy technologies and transmission would result in construction, operations and maintenance, and decommissioning that create GHG emissions as described for the No Action Alternative in Section IV.3.3.1.1. Emissions for the 2040 horizon appear here, although the year-to-year rates would vary as the renewable energy facilities and associated transmission capacity are to be on line by 2040. Separate discussions appear for the

GHG emissions caused by construction and operations and maintenance activities, the effects of land use conversion, and the indirect GHG emissions reductions that would occur because of the energy output provided by the renewable energy facilities.

Emissions From Development Activities: Construction, Operations, and Decommissioning. Projects developed under Alternative 2 within the DRECP area would have a combined capacity of approximately 20,000 MW when built out by 2040. Construction emissions plus operations emissions to develop this capacity across the entire DRECP area would cause GHG emissions at a rate of approximately 200,000 $MTCO_2E$ per year or approximately 107,260 $MTCO_2E$ per year on BLM-managed lands during the life of the Plan.

Emissions Related to Land Use Conversion. There would be more ground disturbance and vegetation removal on BLM land due to renewable energy development under Alternative 2 compared with the Preferred Alternative. Development of transmission would disturb additional areas. Vegetation removal results in a loss of natural carbon uptake, although the actual amount of this loss is uncertain because it would depend on each particular development site, and data on rates of sequestration by vegetation and soils are approximations (see Table IV.3-7).

Table IV.3-7
Estimated Loss of Annual Carbon Uptake – Alternative 2

Alternative	Permanent Disturbance (acres)	Carbon Sequestered ($MTCO_2E$), Low Est.[1]	Carbon Sequestered ($MTCO_2E$), High Est.[2]
Alternative 2 (Total BLM Portion)	53,816	-65,100	-190,000

[1] Estimate for "average U.S. forests," including desert scrub environments. Desert scrub sequesters less carbon than other U.S. forest categories. http://www.epa.gov/cleanenergy/energy-resources/refs.html#pineforests.

[2] Estimate for "grasslands," as reported by the California Climate Action Registry and the California Emissions Estimator Model, which is a category that includes shrub communities that fall below the threshold values used in the forest land category (http://www.caleemod.com, Appendix A).

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Emissions Avoided by Producing Electricity. The GHG emissions reductions for Alternative 2 would occur at the same displacement rates described for the No Action Alternative in Section IV.3.3.1.1. The GHG emissions reductions for Alternative 2 would be approximately 10.3 million $MTCO_2E$ per year for the combined renewable energy technologies on BLM land (see Table IV.3-8). Because the GHG avoided from fossil fuel-fired power plants would greatly exceed the GHG emissions caused by renewable

energy development activities and land use conversion, the electricity produced under Alternative 2 would reduce California's GHG emissions.

Table IV.3-8
Annual GHG Emissions Reductions – Alternative 2

Technology	Annual Production (MWh)	Avoided Emissions ($MTCO_2E$)
Solar[1]	12,115,275	4,561,000
Wind[1]	10,959,564	4,126,000
Geothermal[2]	6,940,697	1,637,000
Total	**30,015,536**	**10,324,000**

[1] Emissions avoided/displaced for solar and wind energy are 830 pounds per MWh (ARB 2010).
[2] Emissions avoided/displaced for geothermal energy are 520 pounds per MWh (ARB 2010).

Impact MC-2: Construction or operation of Plan components would conflict with an applicable plan, policy, or regulation intended to address climate change.

Projects developed under Alternative 2 would support the state's GHG emissions reductions goals and plans by generating electricity from renewable energy resources instead of fossil-fuel resources. This displacement of GHGs would be consistent with the California Global Warming Solutions Act, GHG reduction goals, and the Climate Change Scoping Plan (see Volume III, Section III.3.1.2). Individual renewable energy projects would cause no potential conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

Impacts on Variance Process Lands

Variance Process Lands are neither conservation lands nor DFAs. They are a subset of the variance lands identified in the Solar PEIS ROD and additional lands that, based on current information, have moderate to low ecological value and ambiguous value for renewable energy. If renewable energy development occurs on Variance Process Lands, a LUPA would not be required, so the environmental review process would be somewhat simpler than if the location were left undesignated.

Variance Process Lands for each alternative are as shown in Chapter IV.1, Table IV.1-2 and in Volume II, Chapter II.5, Figure II.5-1 for Alternative 2. Development of the Variance Process Lands would have similar air quality effects as described under Impacts MC-1 and MC-2.

Impact Reduction Strategies

The implementation of the Proposed LUPA would result in conservation of some desert lands as well as the development of renewable energy generation and transmission facilities on other lands. The impacts of the renewable energy development covered by the

Proposed LUPA would be lessened in two ways. First, it incorporates CMAs for each alternative, including specific biological conservation designation components and LUPA components. Second, the implementation of existing laws, orders, regulations, and standards would reduce the impacts of project development.

Design Features of the Solar PEIS

The Solar Programmatic EIS (PEIS) does not include any design features for the specific purposes of reducing GHG or avoiding potential impacts due to climate change.

Conservation and Management Actions

The conservation strategy for Alternative 2 (presented in Volume II, Section II.5.4) defines specific actions that would reduce the impacts of this alternative. The conservation strategy defines the conservation designations and specific CMAs for the Preferred Alternative.

Laws and Regulations

Similar to the No Action Alternative, existing laws and regulations will reduce certain impacts of DRECP implementation. Relevant regulations are presented in the Regulatory Setting in Chapter III.3. The requirements of relevant laws and regulations are summarized for the No Action Alternative in Section IV.3.3.1.1.

IV.3.3.4.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

Alternative 2 would provide about 5.2 million acres within the DRECP area with protective land designations. Establishing lands with protective designations provides GHG benefits because limiting development on the lands restricts the potential removal of vegetation, which would allow the natural carbon uptake of existing soils and vegetation to continue in these areas.

The BLM LUPA land designations protect ecological, historical, cultural, scenic, scientific, and recreational resources and values. While other land uses within these areas are allowed, they must be compatible with the resources and values that the land designation is intended to protect. Establishing lands with protective designations provides GHG benefits.

IV.3.3.4.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside of the DRECP area on meteorology and climate change would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.3.3.1.3.

IV.3.3.4.4 Comparison of Alternative 2 With Preferred Alternative

Alternative 2 would produce greater levels of electricity from renewable resources installed on BLM land compared with the Preferred Alternative.

The mix of technologies in Alternative 2 would result in much more wind generation capacity being installed on BLM land compared with the Preferred Alternative (see Tables IV.3-4 and IV.3-8). When the avoided or displaced GHG emissions are calculated (see Section IV.3.3.1.1 for the rationale), the generation mix of Alternative 2 would displace more (about 2.7 million $MTCO_2E$ more) GHG emissions per year, which means a greater level of GHG emissions would be reduced (i.e., displaced) under Alternative 2 than under the Preferred Alternative.

The BLM land designations and management actions would not change the calculations for Impacts MC-1 and MC-2 analyzed under Alternative 2 and the Preferred Alternative. The range of loss of natural carbon uptake would remain the same, as would the MWh produced under both alternatives and the GHG emissions reductions. The streamlined development is anticipated to occur under both of the alternatives.

IV.3.3.5 Alternative 3

IV.3.3.5.1 Impacts of Renewable Energy and Transmission Development

Alternative 3 assumes that a mix of technologies on BLM land will produce 18.1 million MWh annually. The mix includes 6,376 MW of generation capacity installed on BLM land, built out, and on line by 2040.

Streamlining renewable energy development on BLM lands within the DFAs would not change the numeric calculations for Impacts MC-1 and MC-2. The range of loss of natural carbon uptake would remain the same, as would the MWh produced under Alternative 3 and the GHG emissions reductions.

Streamlining development may result in faster delivery of electricity to the grid, thereby achieving the GHG emissions reductions more quickly and maintaining consistency with the California Global Warming Solutions Act and the Climate Change Scoping Plan.

Impact MC-1: Construction or operation of Plan components would generate GHG emissions.

All of the activities related to renewable energy and transmission technologies would result in construction, operations and maintenance, and decommissioning activities that would produce GHG emissions, as described for the No Action Alternative in Section IV.3.3.1.1. Emissions for the 2040 horizon appear here, although the year-to-year rates would vary as

the renewable energy facilities and associated transmission capacity are to be on line by 2040. Separate discussions appear for the GHG emissions caused by construction and operations and maintenance activities, the effects of land use conversion, and the indirect GHG emissions reductions that would occur because of the energy output provided by the renewable energy technologies.

Emissions from Development Activities: Construction, Operations, and Decommissioning. Projects developed under Alternative 3 within the DRECP area would have a combined capacity of approximately 20,000 MW upon being built out by 2040. Construction emissions plus operations emissions to develop this capacity across the entire DRECP area would cause GHG emissions at a rate of approximately 200,000 $MTCO_2E$ per year or approximately 63,760 $MTCO_2E$ per year on BLM-managed lands during the life of the DRECP.

Emissions Related to Land Use Conversion. There would be less ground disturbance and vegetation removal on BLM land due to renewable energy development under Alternative 3 compared with the Preferred Alternative. Development of transmission would disturb additional areas. Vegetation removal results in a loss of natural carbon uptake, although the actual amount of this loss is uncertain because it would depend on each particular development site, and data on rates of sequestration by vegetation and soils are approximations (see Table IV.3-9).

Table IV.3-9
Estimated Loss of Annual Carbon Uptake – Alternative 3

Alternative	Permanent Disturbance (acres)	Carbon Sequestered ($MTCO_2E$), Low Est.[1]	Carbon Sequestered ($MTCO_2E$), High Est.[2]
Alternative 3 (Total BLM Portion)	37,089	-44,900	-130,900

[1] Estimate for "average U.S. forests," including desert scrub environments. Desert scrub sequesters less carbon than other U.S. forest categories. http://www.epa.gov/cleanenergy/energy-resources/refs.html#pineforests.

[2] Estimate for "grasslands," as reported by the California Climate Action Registry and the California Emissions Estimator Model, which is a category that includes shrub communities that fall below the threshold values used in the forest land category (http://www.caleemod.com, Appendix A).

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Emissions Avoided by Producing Electricity. The GHG emissions reductions for Alternative 3 would occur at the same displacement rates described for the No Action Alternative in Section IV.3.3.1.1. The GHG emissions reductions for Alternative 3 would be approximately 5.8 million $MTCO_2E$ per year for the combined renewable energy technologies on BLM land (see Table IV.3-10). Because the GHG avoided from fossil fuel-

fired power plants would greatly exceed the GHG emissions caused by renewable energy development activities and land use conversion, the electricity produced under Alternative 3 would reduce California's GHG emissions.

Table IV.3-10
Annual GHG Emissions Reductions – Alternative 3

Technology	Annual Production (MWh)	Avoided Emissions ($MTCO_2E$)
Solar[1]	10,038,181	3,779,000
Wind[1]	1,008,261	380,000
Geothermal[2]	7,027,658	1,658,000
Total	**18,074,100**	**5,817,000**

[1] Emissions avoided/displaced for solar and wind energy are 830 pounds per MWh (ARB 2010).
[2] Emissions avoided/displaced for geothermal energy are 520 pounds per MWh (ARB 2010).

Impact MC-2: Construction or operation of Plan components would conflict with an applicable plan, policy, or regulation intended to address climate change.

Projects developed under Alternative 3 would support the state's GHG emissions reductions goals and plans by generating electricity from renewable energy resources instead of fossil-fuel resources. This displacement of GHGs would be consistent with the California Global Warming Solutions Act, GHG reduction goals, and the Climate Change Scoping Plan (see Volume III, Section III.3.1.2). Individual renewable energy projects would cause no potential conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

Impacts on Variance Process Lands

Variance Process Lands are neither conservation lands nor DFAs. They are a subset of the variance lands identified in the Solar PEIS ROD and additional lands that, based on current information, have moderate to low ecological value and ambiguous value for renewable energy. If renewable energy development occurs on Variance Process Lands, a LUPA would not be required, so the environmental review process would be somewhat simpler than if the location were left undesignated.

Variance Process Lands for each alternative are as shown in Chapter IV.1, Table IV.1-2 and in Volume II, Chapter II.6, Figure II.6-1 for Alternative 3. Development of the Variance Process Lands would have similar air quality effects as described under Impacts MC-1 and MC-2.

Impact Reduction Strategies

The implementation of the Proposed LUPA would result in conservation of some desert lands as well as the development of renewable energy generation and transmission

facilities on other lands. The impacts of renewable energy development would be lessened in two ways. First, the Proposed LUPA incorporates CMAs for each alternative, including specific biological conservation designation components and LUPA components. Second, the implementation of existing laws, orders, regulations, and standards would reduce the impacts of project development.

Design Features of the Solar PEIS

The Solar Programmatic EIS (PEIS) does not include any design features for the specific purposes of reducing GHG or avoiding potential impacts due to climate change.

Conservation and Management Actions

The conservation strategy for Alternative 3 (presented in Volume II, Section II.6.4) defines specific actions that would reduce the impacts of this alternative. The conservation strategy defines the conservation designations and specific CMAs for the Preferred Alternative.

Laws and Regulations

Similar to the No Action Alternative, existing laws and regulations will reduce certain impacts of DRECP implementation. Relevant regulations are presented in the Regulatory Setting in Volume III. The requirements of relevant laws and regulations are summarized for the No Action Alternative in Section IV.3.3.1.1.

IV.3.3.5.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

Alternative 3 would provide about 5 million acres within the DRECP area with protective land designations. Establishing lands with protective designations provides GHG benefits because limiting development on the lands restricts the potential removal of vegetation, which would allow the natural carbon uptake of existing soils and vegetation to continue in these areas.

The BLM LUPA land designations protect ecological, historical, cultural, scenic, scientific, and recreational resources and values. While other land uses within these areas are allowed, they must be compatible with the resources and values that the land designation is intended to protect. Establishing lands with protective designations provides GHG benefits.

IV.3.3.5.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside of the DRECP area on meteorology and climate change would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.3.3.1.3.

IV.3.3.5.4 Comparison of Alternative 3 With Preferred Alternative

Alternative 3 would produce lower levels of electricity from renewable resources installed on BLM land compared with the Preferred Alternative.

The mix of technologies in Alternative 3 would result in somewhat less solar and much less wind generation capacity being installed on BLM land compared with the Preferred Alternative (see Tables IV.3-4 and IV.3-10). When the avoided or displaced GHG emissions are calculated (see Section IV.3.3.1.1 for the rationale), the generation mix of Alternative 3 would displace fewer (nearly 1.7 million $MTCO_2E$ less) GHG emissions per year, which means a lower level of GHG emissions would be reduced (i.e., displaced) under Alternative 3 than under the Preferred Alternative.

The BLM land designations and management actions would not change the calculations for Impacts MC-1 and MC-2 analyzed under Alternative 3 and the Preferred Alternative. The range of loss of natural carbon uptake would remain the same, as would the MWh produced under both alternatives and the GHG emissions reductions. The streamlined development is anticipated to occur under both of the alternatives.

IV.3.3.6 Alternative 4

IV.3.3.6.1 Impacts of Renewable Energy and Transmission Development

Alternative 4 assumes that a mix of technologies on BLM land will produce 19.4 million MWh annually. The mix includes 7,094 MW of generation capacity on BLM land installed, built out, and on line by 2040.

Streamlining renewable energy development on BLM lands within the DFAs would not change the numeric calculations for Impacts MC-1 and MC-2. The range of loss of natural carbon uptake would remain the same, as would the MWh produced under Alternative 4 and the GHG emissions reductions.

Streamlining development may result in faster delivery of electricity to the grid, thereby achieving the GHG emissions reductions more quickly and maintaining consistency with the California Global Warming Solutions Act and the Climate Change Scoping Plan.

Impact MC-1: Construction or operation of Plan components would generate GHG emissions.

All of the activities related to renewable energy technologies and transmission would result in construction, operations and maintenance, and decommissioning activities that would produce GHG emissions, as described for the No Action Alternative in Section IV.3.3.1.1.

Emissions for the 2040 horizon appear here, although the year-to-year rates would vary as the renewable energy and transmission facilities are to be on line by 2040. Separate discussions appear for the GHG emissions caused by construction and operations and maintenance activities, the effects of land use conversion, and the indirect GHG emissions reductions that would occur because of the energy output provided by the renewable energy facilities.

Emissions From Development Activities: Construction, Operations, and Decommissioning. Projects developed under Alternative 4 within the DRECP area would have a combined capacity of approximately 20,000 MW when built out by 2040. Construction emissions plus operations emissions to develop this capacity across the entire DRECP area would cause GHG emissions at a rate of approximately 200,000 $MTCO_2E$ per year or approximately 70,940 $MTCO_2E$ per year on BLM-managed lands during the life of the Plan.

Emissions Related to Land Use Conversion. There would be less ground disturbance and vegetation removal on BLM land due to renewable energy development under Alternative 4 compared with the Preferred Alternative. Development of transmission would disturb additional areas. Vegetation removal results in a loss of natural carbon uptake, although the actual amount of this loss is uncertain because it would depend on each particular development site, and data on rates of sequestration by vegetation and soils are approximations (see Table IV.3-11).

Table IV.3-11
Estimated Loss of Annual Carbon Uptake – Alternative 4

Alternative	Permanent Disturbance (acres)	Carbon Sequestered ($MTCO_2E$), Low Est.[1]	Carbon Sequestered ($MTCO_2E$), High Est.[2]
Alternative 4 (Total BLM Portion)	41,350	-50,000	-146,000

[1] Estimate for "average U.S. forests," including desert scrub environments. Desert scrub sequesters less carbon than other U.S. forest categories. http://www.epa.gov/cleanenergy/energy-resources/refs.html#pineforests.

[2] Estimate for "grasslands," as reported by the California Climate Action Registry and the California Emissions Estimator Model, which is a category that includes shrub communities that fall below the threshold values used in the forest land category (http://www.caleemod.com, Appendix A).

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Emissions Avoided by Producing Electricity. The GHG emissions reductions for Alternative 4 would occur at the same displacement rates described for the No Action

Alternative in Section IV.3.3.1.1. These GHG emissions reductions for Alternative 4 would be approximately 6.5 million $MTCO_2E$ per year for the combined renewable energy technologies on BLM land (see Table IV.3-12). Because the GHG avoided from fossil fuel-fired power plants would greatly exceed the GHG emissions caused by renewable energy development activities and land use conversion, the electricity produced under Alternative 4 would reduce California's GHG emissions.

Table IV.3-12
Annual GHG Emissions Reductions – Alternative 4

Technology	Annual Production (MWh)	Avoided Emissions ($MTCO_2E$)
Solar[1]	10,578,117	3,983,000
Wind[1]	3,191,627	1,202,000
Geothermal[2]	5,590,323	1,319,000
Total	**19,360,067**	**6,504,000**

[1] Emissions avoided/displaced for solar and wind energy are 830 pounds per MWh (ARB 2010).
[2] Emissions avoided/displaced for geothermal energy are 520 pounds per MWh (ARB 2010).

Impact MC-2: Construction or operation of Plan components would conflict with an applicable plan, policy, or regulation intended to address climate change.

Projects developed under Alternative 4 would support the state's GHG emissions reductions goals and plans by generating electricity from renewable energy resources instead of fossil-fuel resources. While GHG emissions would result from projects planned under Alternative 4, as referenced in Impact MC-1, there would be GHG emissions reductions as electricity would be generated by renewable energy technologies rather than fossil-fuel technologies. This displacement of GHGs would be consistent with the California Global Warming Solutions Act, GHG reduction goals, and the Climate Change Scoping Plan (see Volume III, Section III.3.1.2). Individual renewable energy projects would cause no potential conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions.

Impacts on Variance Process Lands

Variance Process Lands are neither conservation lands nor DFAs. They are a subset of the variance lands identified in the Solar PEIS ROD and additional lands that, based on current information, have moderate to low ecological value and ambiguous value for renewable energy. If renewable energy development occurs on Variance Process Lands, a LUPA would not be required, so the environmental review process would be somewhat simpler than if the location were left undesignated.

Variance Process Lands for each alternative are as shown in Chapter IV.1, Table IV.1-2 and in Volume II, Chapter II.7, Figure II.7-1 for Alternative 4. Development of the Variance Process Lands would have similar air quality effects as described under Impacts MC-1 and MC-2.

Impact Reduction Strategies

The implementation of the Proposed LUPA would result in conservation of some desert lands as well as the development of renewable energy generation and transmission facilities on other lands. The impacts of the renewable energy development covered by the Proposed LUPA would be lessened in two ways. First, it incorporates CMAs for each alternative, including specific biological conservation designation components and LUPA components. Second, the implementation of existing laws, orders, regulations, and standards would reduce the impacts of project development.

Design Features of the Solar PEIS

The Solar Programmatic EIS (PEIS) does not include any design features for the specific purposes of reducing GHG or avoiding potential impacts due to climate change.

Conservation and Management Actions

The conservation strategy for Alternative 4 (presented in Volume II, Section II.7.4) defines specific actions that would reduce the impacts of this alternative. The conservation strategy defines the conservation designations and specific CMAs for the Preferred Alternative.

Laws and Regulations

Similar to the No Action Alternative, existing laws and regulations will reduce certain impacts of DRECP implementation. Relevant regulations are presented in the Regulatory Setting in Chapter III.3. The requirements of relevant laws and regulations are summarized for the No Action Alternative in Section IV.3.3.1.1.

IV.3.3.6.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

Alternative 4 would provide about 4.4 million acres within the DRECP area with protective land designations. Establishing lands with protective designations provides GHG benefits because limiting development on the lands restricts the potential removal of vegetation, which would allow the natural carbon uptake of existing soils and vegetation to continue in these areas.

The BLM LUPA land designations protect ecological, historical, cultural, scenic, scientific, and recreational resources and values. While other land uses within these areas are allowed, they must be compatible with the resources and values that the land designation is intended to protect. Establishing lands with protective designations provides GHG benefits.

IV.3.3.6.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside of the DRECP area on meteorology and climate change would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.3.3.1.3.

IV.3.3.6.4 Comparison of Alternative 4 With Preferred Alternative

Alternative 4 would produce lower levels of electricity from renewable resources installed on BLM land compared with the Preferred Alternative.

The mix of technologies in Alternative 4 would result in somewhat less renewable generation capacity being installed on BLM land compared with the Preferred Alternative (see Tables IV.3-4 and IV.3-12). When the avoided or displaced GHG emissions are calculated (see Section IV.3.3.1.1 for the rationale), the generation mix of Alternative 4 would displace fewer (nearly 1.1 million $MTCO_2E$ less) GHG emissions per year, which means a lower level of GHG emissions would be reduced (i.e., displaced) under Alternative 4 than under the Preferred Alternative.

The BLM land designations and management actions would not change the calculations for Impacts MC-1 and MC-2 analyzed under Alternative 4 and the Preferred Alternative. The range of loss of natural carbon uptake would remain the same, as would the MWh produced under both alternatives and the GHG emissions reductions. The streamlined development is anticipated to occur under both of the alternatives.

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IV.4 GEOLOGY AND SOILS

IV.4.1 Approach to Impact Analysis

This chapter addresses the potential impacts on geologic and soil resources from implementing the Bureau of Land Management (BLM) Land Use Plan Amendment (LUPA) for the Desert Renewable Energy Conservation Plan (DRECP) alternatives. This analysis is based on the description in Volume II of the Proposed LUPA, including actions associated with renewable energy development that would be permitted within Development Focus Areas (DFAs).

This chapter provides an analysis of impacts from geologic hazards and problematic soils; Volume III, Chapter III.4 describes existing conditions for geologic hazards and soil resources. Three tables supporting this chapter appear in Appendix R2.4. These tables present the acreage of soil texture, erosive soils, and expansive soils within DFAs for each alternative.

Specific impacts of renewable energy facility development would depend on a variety of factors, including project location within the DFAs, type and scale of technology, the size of the development, and site-specific soil conditions. Due to the uncertainty of specific locations for development within the DFAs, this impact analysis is based on the total acreage of land that could be affected.

This analysis of impacts on geology and soils assumes that:

- Soil resources within BLM-administered lands will be managed to meet standards in the Rangeland Health Standards and Guidelines for California and Northwestern Nevada.
- Substantial surface disturbance to soil—including exposure of bare ground, loss of vegetation and soil biotic crusts, and rutting on unsurfaced roads—would increase soil compaction, water runoff, and downstream sediment loads. It would also lower soil productivity and increase fugitive dust emissions, degrading water and air quality, altering channel structure, and affecting overall watershed health, air quality, and potentially human health.
- Several factors would influence the degree of impact to any one disturbance or series of disturbances, including the disturbance's location within the watershed, the time and degree of the disturbance, existing vegetation, and levels of precipitation at the time of the disturbance.
- Any access roads would follow the design standards of the BLM Roads Design Handbook H-9113-1 or the higher standard required by the State of California to protect air or water quality.

- Surface soil stockpiles would be set aside for future restoration after grading or excavation.
- Design features and management practices identified in the Best Management Practices and Guidance Manual for Renewable Energy Development (California Energy Commission [CEC] 2010]) would be followed for site-specific projects.

The DRECP Environmental Impact Statement (EIS) and LUPA are programmatic documents; the analysis is therefore primarily for typical impacts and does not evaluate site-specific impacts from specific projects. Project-specific impacts would instead be assessed during the permitting process and in supplemental National Environmental Policy Act (NEPA) or joint NEPA/California Environmental Quality Act (CEQA) documents (for projects under CEC jurisdiction). Because the specific locations of future renewable energy projects are still undetermined, this impact analysis presents information on faults and problematic soils within DFAs, Variance Process Lands, and BLM LUPA conservation designations.

IV.4.2 Typical Impacts Common to All Action Alternatives

The potential effects of renewable energy development (solar, wind, geothermal and transmission) upon geology and soils are evaluated through review of completed CEQA and NEPA documents, the Solar Programmatic Environmental Impact Statement (Solar PEIS), the Wind PEIS, and the Geothermal PEIS. Existing conditions for geology and soils are described in Chapter III.4.

This section analyzes the typical direct and indirect impacts of solar, wind, and geothermal projects and transmission lines. Approval of a LUPA alternative would facilitate the development of renewable energy projects within defined DFAs by streamlining both permitting decisions and mitigation actions for protected species. Each future project would undergo required NEPA and/or CEQA analysis, but information in this EIS could prove useful for document preparation. Impacts related to renewable energy projects and transmission would vary depending upon the technology proposed, the location of the project area, the time and degree of disturbance from development, and the size and complexity of the facility.

LUPA components could have indirect impacts on geologic features including important scenic and structural geologic features and seismic risk; seismic activity and other geologic hazards may have indirect impacts on projects. LUPA alternatives could also cause indirect impacts on soils, particularly sensitive soils. The alteration or removal of vegetative cover could require more and wider roads or cause surface disturbances in areas with high wind or water erosion. Other project activities could damage soil surface covers like desert pavement or biological soil crusts.

Because LUPA land designations would be managed to protect ecological, historic, cultural, scenic, scientific, and recreation resources and values, they would also provide general protection for geologic and soil resources. While other land uses are allowed within these areas, those uses must be compatible with the resources and values that the land designation is intended to protect.

Guidelines for the allowable uses and management of National Conservation Lands, lands with wilderness characteristics, and trail management corridors appear in the LUPA description in Volume II. Details on the goals, objectives, allowable uses, and management actions for each Area of Critical Environmental Concern (ACEC) and Special Recreation Management Area (SRMA) appear in LUPA worksheets in Appendix H.

IV.4.2.1 Impacts of Renewable Energy and Transmission Development

This analysis considers a wide range of potential geologic impacts from renewable energy development and transmission. Impacts include soil erosion, disturbance of desert pavement, and potential effects of geologic hazards including active faults, potentially active volcanoes, landslides and mudslides, and the impacts of expansive or corrosive soils over the lifetime of renewable energy projects. Each of these impacts is discussed in the following sections.

IV.4.2.1.1 Impacts of Site Characterization

Site characterization for renewable energy projects includes land surveying; biological, cultural and paleontological surveys; and geotechnical studies. These activities create ground disturbances with a range of impacts. Land surveying and biological, cultural, and paleontological surveying are low-impact activities. Geotechnical studies have low to moderate impact, depending upon specific site environments. Impacts from site characterization also include increased soil erosion and the potential disturbance of desert pavement.

IV.4.2.1.2 Impacts of Construction and Decommissioning

Soil erosion. Soil erodibility is determined primarily by soil texture. Soils with high silt content erode more readily than soils with high clay content. Weathering happens when wind or water gradually break rocks down (e.g., when water freezes within the cracks of rocks then expands the rocks to the point of fracture). Weathered soils are more susceptible to erosion because they have smaller particles, but a wide range of soil particle size is susceptible to erosion, depending on the strength of the wind or water flows. Portions of the desert contain soils with a moderate to high potential for erosion from wind and water.

During project construction and decommissioning excavation, grading, construction activities, and watering for dust control could all contribute to soil erosion. If blasting is required during excavation, it could also disturb the soil and increase erosion. In addition, without effective best management practices (BMPs), storms could increase erosion during both construction and decommissioning.

Desert pavement. As stated in Volume III, Section III.4.2, about 60% of the surficial geologic formations within the DRECP area are alluvium (material deposited by moving water). Over time, alluvium can form a protective surface crust of pebbles called desert pavement. The disturbance of desert pavement would substantially increase surface erosion from wind and water and create dust hazards. These surficial deposits are valuable because the natural regeneration of desert pavement is very slow in the Mojave Desert. Excavation, grading, and ground disturbance from workers, vehicles, and equipment would damage existing desert pavement.

Sand Transport. Sand transport corridors are zones where windblown sands move across the desert. They are important because they create valuable habitat for sensitive biological resources. Development of renewable energy projects in some parts of the desert, including the Eastern Riverside County region, would be in or near important sand transport corridors. The sand transport corridor in the eastern portion of Riverside County runs parallel to Interstate 10 (I-10) in Riverside County between Desert Center and Blythe. Other sand transport corridors include the Mojave River corridor (including the Kelso Dunes), Bristol Trough corridor (including the Cadiz and Danby dunes), Rice Valley corridor (including the Rice Valley Dunes), and Clark's Pass corridor (including the Dale Lake Dunes and Ford-Palen Dunes) (U.S. Geological Survey [USGS] 2003).

Renewable energy projects in these regions could interrupt sand transport and consequently affect valuable habitat within corridors containing active sand dunes. Conversely, sand transport could also damage renewable energy facilities and hinder energy production. Large areas of dune systems and sand transport corridors are located in the central and southern portions of the DRECP area. Approximately 1,781,000 acres of dune systems and sand transport corridors exist in the entire DRECP area (Data Basin 2014[a]). The highest concentrations of dune systems and sand transport corridors in the DRECP area are:

- 841,000 acres in the eastern part of Riverside County.
- 245,000 acres in the Imperial Valley region.
- 205,000 acres in the Central Mojave region.

See Chapter III.4, Figure III.4-2, Dune Systems and Sand Transport Corridors within the DRECP Area, Section III.4.2.2.1.1.

IV.4.2.1.3 Impacts of Operations and Maintenance

Seismic, volcanic, or landslide activity. Based upon the number and length of active faults described in Section III.4.3, the southern California desert is seismically active. Some of the longest and most active faults in the state pass through the desert, including the San Andreas Fault. See Figure III.4-4, Earthquake Faults within the DRECP Area and Table III.4-2, Largest Faults Within the DRECP Area, for the specific locations and strengths of faults in the DRECP area. Seismic activity is likely in areas both around and west of the San Andreas and Superstition Hills faults. Major earthquakes like the Landers Earthquake of 1992 (Richter magnitude 7.3), will continue to strike, causing property damage. See Table III.4-3 (in Section III.4.4, Earthquakes Within the DRECP Area With a Magnitude 6.0 or Higher. Based on project location, future earthquakes could damage renewable energy facilities and transmission lines.

Volcanic activity is of greatest concern in areas of recent eruptions. Younger volcanic flows exist in the Salton Buttes in the Imperial Borrego Valley ecoregion subarea (see Appendix R1, Table R1.4-1, Regional Geology in the DRECP Area), in areas east of Barstow near the Pisgah Crater, and in southern Inyo County. However, the low likelihood that renewable energy facilities would be located in the immediate area of an active volcanic site means that volcanic activity is not likely to affect renewable energy development.

Geothermal resources would more likely be sited in areas with volcanic activity. These resources have been identified in Imperial County, as well as in the Coso and Randsburg areas of Inyo and San Bernardino counties.

Solar facilities are not generally built on steep slopes where landslides are most likely. It is therefore unlikely that landslides would damage solar projects. Before site design and construction, site-specific geotechnical investigations would be required to ensure that landslide hazards to wind turbines would be minimal during project operations and maintenance.

Expansive soils. Expansive soils have a high clay content, which has a greater ability to shrink and swell with changes in soil moisture content. This includes soils with clay, silty clay, and clay loam textures. As these soils expand and contract, they could damage structural and operational elements of renewable energy facilities. Nearly 589,000 acres of expansive soils are within the DRECP area.

The highest concentrations of expansive soils within the DRECP area are:

- 156,000 acres in the Death Valley area.

- 89,000 acres in the eastern end of Riverside County.
- 69,000 acres in the Owens River Valley.

For further details on soil texture by ecoregion subarea, see Appendix R1, Figures R1.4-1 through R1.4-10.

Corrosive Soils. As stated in Section III.4.2.2.2, mild to aggressive soil corrosivity within the DRECP area could corrode ungalvanized steel and concrete. Soil corrosion could create hazards that could potentially undermine the long-term integrity of renewable energy infrastructure, including damage to foundations and other parts of structures over the lifetime of the renewable energy projects.

Vegetation in the desert is specifically adapted to its native soil characteristics. Playas, North American warm desert alkaline scrub, herb playa, and wet flat all indicate potentially damaging corrosive soil. Approximately 509,000 acres of these soils are within the DRECP area (Data Basin 2014[b]). The highest concentrations of potentially corrosive soils are:

- 133,000 acres in the Death Valley portion of the DRECP area.
- 117,000 acres in the Central Mojave portion of the DRECP area.
- 63,000 acres in the Lucerne Valley portion of the DRECP area.
- 55,000 acres in the West Mojave portion of the DRECP area.
- 28,000 acres in the Owens Valley portion of the DRECP area.

For further information on corrosive soils within the DRECP area, see Section III.4.2.2.2, Corrosive Soils, and Figure III.4-3, Potentially Corrosive Soils Within the DRECP Area.

IV.4.2.2 Impacts of the Ecological and Cultural Conservation and Recreation Designations

Lands within conservation areas are protected from development, so renewable energy projects would not be built in those areas.

IV.4.3 Impact Analysis by Alternative

The following sections present impact analyses for the No Action Alternative, the Preferred Alternative, and Alternatives 1 through 4.

IV.4.3.1 No Action Alternative

The No Action Alternative assumes that renewable energy, transmission development, and mitigation for projects in the DRECP area would occur on a project-by-project basis and in a pattern consistent with past and present renewable energy and transmission projects. The No Action Alternative identifies approximately 2,804,000 available acres for renewable energy development. The No Action Alternative does not include new BLM LUPA conservation designations, though existing conservation comprises approximately 7.6 million acres of the DRECP area in all alternatives.

IV.4.3.1.1 Impacts of Renewable Energy and Transmission Development

Available developable areas in the No Action Alternative are concentrated on BLM land in the Tehachapi Mountains, West Mojave, Imperial Valley, Eastern Riverside County, and Kingston and Funeral Mountains regions of the DRECP area. Impacts to soils, geology, and geologic hazards would result from the development of solar, wind, and geothermal projects. There would also be impacts from transmission development.

The potential for increased soil erosion is quantified by the acreage of erosive soils that may be disturbed during construction and decommissioning and, to a lesser degree, during site characterization. The potential for impacts from geologic hazards is based on miles of active fault lines within 25 miles of developable areas under the No Action Alternative. Other geology and soil impacts such as disturbance to desert pavement and structural damage from expansive or corrosive soils are assessed more qualitatively.

In general, under the No Action Alternative, existing BLM land management plans within the LUPA Decision Area would continue. Existing ACECs and wildlife allocation areas would continue to limit adverse impacts to geology and soils because only projects consistent with those areas' goals and objectives would be allowed. Existing SRMAs would continue to experience potentially adverse effects from soil erosion, depending upon the extent of allowable uses and management practices within specific SRMAs.

Under the No Action Alternative, development would continue on certain BLM lands including Solar Energy Zones, Solar PEIS Variance Lands, and with a project-specific LUPA.

Impact SG-1: Expose people or structures to injury or damage from seismic, volcanic, or landslide activity.

As described in Volume III, Section III.4.3, the DRECP area is seismically and volcanically active with major fault lines, young volcanic features, and landslide sediment deposits. Within the DRECP area, major faults include some of the largest in the state, such as the San Andreas and San Jacinto fault systems. During the lifetime of a renewable energy facility,

earthquakes within the DRECP area are likely. Table IV.4-1 shows major active faults, defined by the USGS as having ruptured within the Holocene (the past 11,000 years) (USGS 2014[a]).

For each fault, Table IV.4-1 shows both its length within the DFA boundary and its length outside the DFA but within 25 miles of the DFA boundary. Under the No Action Alternative, 86.6 miles of active fault lines are within developable areas and 798.7 miles are outside developable areas but within the 25-mile buffer set for the fault analysis. See Volume III, Table III.4-2, Largest Faults Within the DRECP Area, for the earthquake magnitude potential for each of the listed faults and their associated Alquist-Priolo designations. The faults presented in Table IV.4-1 represent a potential geologic hazard that could damage renewable energy facilities. While the majority of these facilities would not include occupied structures, damage to property could still be considerable.

Table IV.4-1
Faults Within a 25-Mile Radius of Developable Areas in the No Action Alternative

Fault Name	Length of Fault Within Developable Area (miles)	Length of Fault Outside Developable Areas (miles)
Blackwater Fault	0.3	13.0
Bullion Fault		20.4
Calico Fault Zone	3.8	25.6
Coyote Creek Fault	3.7	29.0
Death Valley Fault Zone		59.1
Elsinore Fault Zone	1.7	31.1
Emerson Fault	2.3	28.0
Furnace Creek Fault Zone		6.4
Garlock Fault Zone	21.6	118.3
Gravel Hills - Harper Fault Zone	2.7	23.5
Helendale Fault	14.7	16.1
Johnson Valley Fault	4.6	33.0
Laguna Salada Fault Zone	3.3	16.4
Lenwood Fault	22.6	21.5
Lockhart Fault	2.1	1.8
Mill Creek Fault		22.9
Pinto Mountain Fault	0.1	31.8
San Andreas Fault Zone	3.1	139.6
San Bernardino Fault		31.7
San Cayetano Fault		1.1
San Jacinto Fault Zone		85.3
Santa Susana Fault Zone		0.7
West Calico Fault		21.0

Table IV.4-1
Faults Within a 25-Mile Radius of Developable Areas in the No Action Alternative

Fault Name	Length of Fault Within Developable Area (miles)	Length of Fault Outside Developable Areas (miles)
White Wolf Fault		21.4
Grand Total	**86.6**	**798.7**

Volume III, Section III.4.4.4, describes locations of recent volcanic activity. Within available development areas in the No Action Alternative, there is minimal acreage of recent volcanic flow rocks. The likelihood of a renewable energy facility being located near an active volcanic site is low because both developers and regulators would avoid areas with this risk. Facility damage or threat to life from volcanic activity is possible but unlikely.

Impact SG-2: Trigger or accelerate soil or sand erosion.

Erosion. Table R2.4-2, Acreage of Erosive Soils Within DFAs for Each Alternative, (Appendix R2) shows the erosion potential of soil textures found in the DRECP area and the acreages of soil textures with erosion potential in the DFAs, for each alternative. On developable BLM-administered lands in the No Action Alternative, there are approximately 1,451,000 acres of soils with a moderate to high potential for wind erosion and approximately 795,000 acres of soils with a moderate to high potential for water erosion. Development of renewable energy facilities within these areas in the No Action Alternative would increase the likelihood of soil erosion from wind and water.

Sand Transport. Under the No Action Alternative, developable areas in the Eastern Riverside County region are on or near an important sand transport corridor in the Chuckwalla Valley. The corridor runs parallel to I-10 in Riverside County between the areas of Desert Center and Blythe. Other sand transport corridors include the Mojave River corridor, which includes the Kelso Dunes, the Bristol Trough corridor, which includes the Cadiz and Danby dunes, the Rice Valley corridor, which includes the Rice Valley Dunes, and the Clark's Pass corridor, which includes the Dale Lake Dunes and Palen-Ford Dunes (USGS 2003). Renewable energy facilities in these developable areas could impede sand transport and affect valuable habitat within this corridor of active sand dunes. Approximately 307,000 acres of dune systems and sand transport corridors are within developable areas in the No Action Alternative.

While existing management plans do not establish specific goals for soil resources, BLM uses standard best management practices (BMPs) to protect soil resources. Among the reference guides listing these BMPs is the BLM publication *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development*, commonly referred to as the Gold

Book, last updated in 2007. Under the No Action Alternative, BLM's management of geology and soil resources through these standard BMPs, as well as mitigation imposed as a result of NEPA review, would reduce adverse impacts during construction.

Impact SG-3: Expose structures to damage from corrosive or expansive soils.

As stated in Section IV.4.2.1.3, Impacts of Operations and Maintenance, corrosive soils could damage foundations and structural elements of renewable energy facilities. Expansive soils could cause soils to shrink or swell, damaging foundations and other structural elements. The No Action Alternative includes 70,000 acres of potentially expansive soils. See Table R2.4-3, Acreage of Expansive Soil Textures Within DFAs for Each Alternative (Appendix R2). Expansive soils include clay, clay loam, silty clay, and silty clay loam. Corrosive soils are widespread throughout the DRECP area. Playas, North American warm desert alkaline scrub, herb playa, and wet flat all indicate the presence of potentially corrosive soil. Approximately 36,000 acres of potentially corrosive soils are within developable areas in the No Action Alternative.

Impact SG-4: Destroy or disturb desert pavement.

Renewable energy facilities in the No Action Alternative may damage desert pavement. Excavation and grading during construction and decommissioning, as well as ground disturbance from workers, vehicles, and equipment, would damage or disturb this important habitat. Specific locations of desert pavement that have not been mapped would require field surveys.

Impact Reduction Strategies

Laws and Regulations

Existing laws and regulations would reduce the impacts of renewable energy projects in the absence of the DRECP. Relevant regulations are presented in the Regulatory Setting in Volume III. Note that because this EIS addresses amendments to BLM's land use plans, these plans are addressed separately and are not included in this section.

Mechanisms in relevant regulations would reduce impacts as follows:

- The Clean Water Act of 1972 requires operators of construction sites that disturb one acre or more to obtain a permit under the National Pollutant Discharge Elimination System's (NPDES) general permit entitled Stormwater Discharges Associated With Construction Activity. Stormwater runoff from construction activities can significantly affect water quality. This permit requires preparation of a Stormwater Pollution Prevention Plan, which must include a site description; a map

that identifies sources of stormwater discharges on the site; anticipated drainage patterns after major grading; areas where structural and nonstructural measures will be employed; surface waters, including wetlands; and locations of discharge points to surface waters.

- The California Building Code (CBC) Section 1613.3.5 (CBC 2013) requires all new construction to follow earthquake design guidelines by completing a geotechnical investigation for all buildings in Seismic Design Categories C, D, E, and F. The majority of the DRECP area is made up of categories C, D, and E, which are based on the following three criteria:

  1. Probable site ground motion – Probable site motion is based on Federal Emergency Management Agency (FEMA) maps, the maximum acceleration of an object in an earthquake, and a structure's response to wave acceleration. See Volume III, Figure III.4-13, Peak Horizontal Ground Acceleration Within the DRECP Area.

  2. Soil site classifications – Soil classifications A through F include hard rock, rock, dense soil, stiff soil, soft soil, and special soils.

  3. Building occupancy type – Building occupancy contains four types: agricultural, essential, hazardous structures in the event of a collapse, and "other."

- In addition, Appendix J of the CBC requires that developers obtain county grading permits that would contain requirements for the appropriate management of on-site drainage and erosion control.
- The Alquist-Priolo Earthquake Fault Zoning Act (1972) prohibits permitting of buildings used for human occupancy where construction is across active faults.

In addition, the Solar PEIS includes numerous design features that would reduce the impacts of solar energy development on geology and soil resources (full text of all design features is shown in Appendix W). Relevant design features include the following:

- SR1-1 would minimize soil erosion and geologic hazards by identifying local factors that would cause slope instability or on-site soil erosion as well as geologic hazard concerns in proximity to the proposed project.
- SR2-1 would minimize soil erosion and sediment transport during all project phases. It requires minimal ground disturbing activities, culverts to control runoff to minimize erosion, and project siting to avoid disturbing desert pavement and areas with unstable slopes and soils. Construction grading must comply with requirements in CBC 2013. It also requires soil testing that complies with American Society for Testing and Materials standards, studies to determine the effects from

construction on sand transport corridors, and replanting project areas with native vegetation to reduce exposed soil through wind and water erosion.

- SR3-1 requirements would prevent erosion and geologic hazard design elements during operations and maintenance by requiring permanent barriers around washes and wetlands to control erosion; maintaining catch basins, roadway ditches, and culverts; and performing routine site inspections to monitor the effectiveness of erosion and sediment control measures.
- SR4-2 would restore the original grade and drainage patterns on a project site during reclamation and decommissioning.
- SR4-3 would restore a site's natural vegetation patterns and prevent future erosion and sedimentation by seeding and transplanting native plant communities during reclamation and decommissioning.
- WR1-1 would control project site drainage, erosion, and sedimentation through hydrologic analysis and modeling that would identify 100-year 24-hour rainfall events and calculate projected runoff; this would comply with NPDES requirements, manage runoff from impervious surfaces, create or improve landscaping for capturing runoff, and demonstrate that a project will not increase the risk of flooding.

Typical Mitigation Measures

Under the No Action Alternative, individual projects would continue to be reviewed and approved with mitigation measures adopted by BLM. Mitigation for geology and soils generally includes the following:

- **Protect disturbed soil from wind erosion during project construction.** Prior to receiving a construction permit, the applicant shall submit to the lead agency, for review and approval, a sedimentation and erosion control plan that identifies how disturbed surface soils will be stabilized to prevent wind erosion during construction and immediately after construction until revegetation begins. Wind erosion control measures include, but are not limited to, the use of mulch, soil stabilizers, and temporary revegetation (all compatible with special status species). This sedimentation and erosion control plan may also include standard provisions for dust control with water trucks or the periodic application of soil stabilizers.
- **Reduce effects of ground shaking.** Prior to issuance of construction permits, the design-level geotechnical investigations the applicant performs shall include site-specific seismic analyses to evaluate ground accelerations for the design of project components. Based on these findings, project structure designs shall be modified as deemed appropriate by the project engineer if anticipated seismic forces are found to be greater than standard design load stresses on project structures. Study results

and proposed design modifications shall be submitted to the lead agency for review before final project design and issuance of a construction permit.

- **Protect desert pavement.** Grading for new access roads or work areas in areas covered by desert pavement shall be avoided or minimized. If avoidance of these areas is not possible, the desert pavement surface shall be protected from damage or disturbance from construction vehicles temporary surface mats. A plan to identify and avoid damaging sensitive desert pavement shall be prepared and submitted to the lead agency for review and approval prior to construction. This plan shall include:
  - Defining all locations of surface disturbance including new access roads and grading locations.
  - Developing specific measures to protect desert pavement from damage or disturbance by using temporary mats.
  - Applying a nontoxic soil stabilizer before project operation. The applicant shall develop, for review and approval by the lead agency, a plan that outlines the frequency of nontoxic soil stabilizer applications, based on the specifications of the selected soil stabilizer.
  - Evaluating the potential for replacement of desert pavement with a similar gravel-sized layer where required.
- **Conduct landslide surveys and protect against slope instability.** A landslide survey of any steep hillside areas shall be conducted in and adjacent to areas of planned project construction. The survey will identify areas with the potential for unstable slopes, landslides, earth flows, debris flows, and seismically induced slope failure. If the results of the landslide survey indicate that slopes could likely fail and damage these structures, appropriate support and protection measures shall be designed and implemented to minimize potential damage. These design measures may include, but are not limited to, retaining walls, re-engineered slopes, removal of potentially unstable materials, and avoidance of areas below highly unstable areas. Study results and proposed design modifications shall be submitted to the lead agency for review before final project design and issuance of construction permits.
- **Conduct geotechnical studies to assess problem soil characteristics.** Prior to issuance of construction permits, these design-level geotechnical studies by the applicant shall identify the presence, if any, of potentially detrimental soil chemicals such as chlorides and sulfates. Appropriate design measures for protection of reinforcement, concrete, and metal-structural foundation components against corrosion shall be used, such as corrosion-resistant materials and coatings, thicker components for projects exposed to potentially corrosive conditions, and passive or

active cathodic protection systems. The geotechnical studies shall also identify areas with potentially expansive or collapsible soils and include appropriate design features, including the excavation of potentially expansive or collapsible soils during construction and replacement with engineered backfill, ground-treatment processes, and redirection of surface water and drainage away from expansive foundation soils. Studies shall conform to industry standards and American Society for Testing and Materials standards for field and laboratory testing. Study results and proposed solutions shall be submitted to the lead agency for review and approval prior to construction permit issuance.

- **Protect sand and sand transport corridors.** To mitigate loss of sand transport corridors, the project owner shall provide compensatory mitigation that may include compensation for lands purchased in fee title or in easement, in whole or in part, in the following ratios:
  - 3:1 mitigation for direct impacts on stabilized and partially stabilized sand dunes
  - 1:1 mitigation for direct impacts on non-dune Mojave fringe-toed lizard habitat
  - 0.5:1 mitigation for indirect impacts on stabilized and partially stabilized sand dunes

  If compensation lands are acquired, the project owner shall provide funding for the acquisition in fee title or in easement, initial habitat improvements, and long-term maintenance and management of the compensation lands. The compensation lands must include, at a minimum, the number of acres of stabilized and partially stabilized sand dune habitat defined by the lead agency.

  Compensation lands selected for acquisition shall provide suitable habitat for any sand-dependent species. Compensation lands must:

  - Be located within the bounds of the sand transport corridor from which habitat was lost.
  - Build linkages between known populations of sand-dependent species.
  - Be near larger blocks of lands either already protected or planned for protection, or which could be protected long-term by a public resource agency or a nongovernmental organization dedicated to habitat preservation.
  - Not have a history of intensive recreational use or other disturbance that might make habitat recovery and restoration unworkable.
  - Not be characterized by high densities of invasive species, either on or immediately adjacent to parcels that might jeopardize habitat recovery and restoration.

- Not contain hazardous wastes that cannot be removed to make a site suitable for habitat.
- Include water and mineral rights as part of the acquisition.
- Be on land where long-term management is practicable.

- **Security for Implementation of Mitigation:** The project owner shall provide financial assurances to the lead agency that guarantee an adequate level of funding is available to implement the acquisitions and enhance sand-dependent species habitat, as described in this mitigation measure.
- **Preparation of Management Plan:** The project owner shall submit to the lead agency a Management Plan that reflects site-specific enhancement measures for sand-dependent species habitat on acquired compensation lands. The objective of the Management Plan shall be to enhance the value of the compensation lands and may include actions such as weed control, fencing to keep out livestock, erosion control, or protection of sand sources or sand transport corridors.

IV.4.3.1.2 Impacts from Ecological and Cultural Conservation and Recreation Designations

The No Action Alternative has no new conservation designations, but even without approval of one of the action alternatives existing LLPAs, including wilderness areas, would be protected from development. Under the No Action Alternative, renewable energy projects would still be evaluated and approved with project-specific mitigation requirements.

IV.4.3.1.3 Impacts of Transmission Outside the DRECP Area

Outside of the DRECP area, additional transmission lines would be needed to deliver renewable energy to load centers (areas of high demand). It is assumed that new transmission lines outside of the DRECP area would use existing transmission corridors and substations in the more populated coastal areas of the state. Locations outside of the DRECP area where new transmission lines might be constructed are in San Diego, Los Angeles, North Palm Springs–Riverside, and the Central Valley. These areas and their associated geology and soils are described in Volume III, Section III.4.8.

Impact SG-1: Plan components would expose people or structures to injury or damage from seismic, volcanic, or landslide activity.

Active fault lines are located both near and across transmission corridors. Transmission tower failure could expose people or structures to injury or damage from seismic activity or landslides; service interruptions could also result. However, the risk of earthquakes and landslides is considered during site evaluations and in specifications for tower and span designs.

Impact SG-2: Soil or sand erosion would be triggered or accelerated due to plan components.

Transmission tower construction requires earthwork to establish construction areas, tower footings, and site access. Soil disturbed in the process could erode, with the greatest risk being on slopes. Except where corridors pass through the Tehachapi and San Gabriel mountains, transmission corridors outside the DRECP area are in relatively flat terrain. Soil susceptibility to erosion varies by soil type, slope, and vegetative cover. To control erosion, transmission line developers would be required to prepare and implement stormwater pollution prevention plans, which would include erosion control and site restoration. Because of their spacing and relatively narrow profile, transmission towers would not impede natural sand transport.

Impact SG-3: Plan components would expose structures to damage from corrosive or expansive soils.

Corrosive soils could damage tower foundations and expansive soils could cause soils to shrink or swell; both could damage structure foundations. Typical foundation installation involves excavating or boring and installing reinforced steel bar cages and encasing them in concrete. Where soil conditions could potentially damage footings, the excavation is oversized and backfilled with suitable material that will not either corrode or damage footings.

Impact SG-4: Plan components would destroy or disturb desert pavement.

Renewable energy facilities in the Preferred Alternative may cause damage to desert pavement. Excavation and grading during construction and decommissioning, as well as ground disturbance from workers, vehicles, and equipment, would cause damage or disturbance to this important habitat. Specific locations of desert pavement that have not been mapped would require field surveys.

IV.4.3.2 Preferred Alternative

IV.4.3.2.1 Impacts of Renewable Energy and Transmission Development

Under the Preferred Alternative, activities associated with solar, wind, and geothermal development and operation would be permitted within DFAs. The Preferred Alternative includes 388,000 acres of DFAs, approximately 7.6 million acres of existing conservation within the DRECP area, and approximately 4.9 million acres of BLM LUPA conservation designations.

In the Preferred Alternative, dispersed solar development is anticipated in the West Mojave and Eastern Slopes ecoregion subarea, the Cadiz Valley and Chocolate Mountains ecoregion subarea, and the Imperial Borrego Valley ecoregion subarea. Dispersed wind development is anticipated in the West Mojave and Eastern Slopes ecoregion subarea, the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea, and the Cadiz Valley and Chocolate Mountains ecoregion subarea. Dispersed geothermal development is anticipated in the Imperial Borrego Valley and the Owens River Valley ecoregion subareas.

Under the Preferred Alternative, DFAs are located primarily in the Imperial Borrego Valley ecoregion subarea, the Cadiz Valley and Chocolate Mountains ecoregion subarea, the West Mojave and Eastern Slopes ecoregion subarea, and the Panamint Death Valley ecoregion subarea. Impacts to soils, geology, and geologic hazards would occur within the DRECP area from the development of solar, wind, geothermal, and transmission facilities, both within and outside of DFAs.

Soil erosion potential can be quantified based on acreage of erosive soils that may be disturbed during construction and decommissioning and, to a lesser degree, during site characterization. The potential for impacts from geologic hazards can be quantified based on miles of active fault lines within 25 miles of DFAs in the Preferred Alternative. Other geology and soil impacts such as disturbance to desert pavement and structural damage from expansive or corrosive soils are assessed qualitatively.

The Proposed BLM LUPA conservation designations (e.g., National Conservation Lands, ACECs, wildlife allocations, lands with wilderness characteristics, and trail management corridors) would limit renewable energy development and be managed to protect various ecological, historic, cultural, scenic, and scientific resources and values, which would also provide general protection for geologic and soil resources. Disturbance caps on National Conservation Lands and ACECs would provide further protections. National Conservation Lands would make up the majority of proposed BLM land designations under the Preferred Alternative.

Existing or expanded SRMAs would also prohibit surface-occupying renewable energy development, but could conversely still cause soil erosion from recreation, depending upon the extent of allowable uses and management within specific SRMAs.

Impact SG-1: Expose people or structures to injury or damage from seismic, volcanic, or landslide activity.

As described in Volume III, Section III.4.3, the DRECP area is seismically and volcanically active, with major fault lines, young volcanic features, and landslide sediment deposits. Within the DRECP area, major faults include some of the largest in the state, including the San Andreas and San Jacinto faults. During the lifetime of a renewable energy facility, earthquakes within the DRECP area are likely. Table IV.4-2, Faults Within a 25-mile Radius of

DFAs, in the Preferred Alternative, shows major active faults, which the USGS defines as having ruptured within the Holocene (the past 11,000 years) (USGS 2014[a]).

For each listed fault, Table IV.4-2 shows its length within the DFA boundary and its length outside the DFA but within 25 miles of the DFA boundary. Under the Preferred Alternative, 7.6 miles of active fault lines are within DFAs and 766.4 miles are outside DFAs but within the 25-mile buffer set for the fault analysis. See Volume III, Table III.4-2, Largest Faults Within the DRECP Area, for the earthquake magnitude potential for each of the listed faults and their associated Alquist-Priolo designations. The faults presented in Table IV.4-2 represent a potential geologic hazard that could damage renewable energy facilities. While the majority of these facilities would not include occupied residential structures, damage to property could still be considerable.

Table IV.4-2
Faults Within a 25-Mile Radius of DFAs in the Preferred Alternative

Fault Name	Length of Fault Within DFAs (miles)	Length of Fault Outside DFAs (miles)
Blackwater Fault		13.3
Bullion Fault		20.4
Calico Fault Zone		29.4
Coyote Creek Fault		29.6
Elsinore Fault Zone		16.8
Emerson Fault		30.3
Garlock Fault Zone	1.2	131.0
Gravel Hills - Harper Fault Zone		26.2
Helendale Fault	2.7	28.1
Johnson Valley Fault	1.5	36.2
Laguna Salada Fault Zone		19.7
Lenwood Fault	0.1	44.1
Lockhart Fault		3.9
Owens Valley Fault Zone		27.5
Panamint Valley Fault Zone		34.7
Pinto Mountain Fault		22.3
San Andreas Fault Zone	2.1	127.7
San Bernardino Fault		29.2
San Jacinto Fault Zone		53.9
West Calico Fault		21.0
White Wolf Fault		21.4
Grand Total	**7.6**	**766.4**

Source: USGS (2014b)

Volume III, Section III.4.4.4, describes the locations of recent volcanic activity. Within DFAs in the Preferred Alternative, there is less than one square mile of recent volcanic flow rocks. The likelihood of a renewable energy facility being located near an active volcanic site is so low that facility damage or threat to life is possible but unlikely.

Impact SG-2: Trigger or accelerate soil or sand erosion.

Erosion. Table R2.4-2, Acreage of Erosive Soils Within DFAs for Each Alternative (Appendix R2), shows the erosion potential of soil textures found in the DRECP area and acreage of soil textures with moderate to high potential for erosion found in DFAs in each alternative. Within DFAs in the Preferred Alternative, there are approximately 210,000 acres of soils with a moderate to high potential for wind erosion and approximately 107,000acres of soils with a moderate to high potential for water erosion. Development of renewable energy facilities within these areas of DFAs in the Preferred Alternative would increase the likelihood of soil erosion from wind and water.

Sand Transport. Under the Preferred Alternative, DFAs in the East Riverside region are on or near an important sand transport corridor in the Chuckwalla Valley. The corridor runs parallel to I-10 in Riverside County between Desert Center and Blythe. Other sand transport corridors include the Mojave River corridor, which includes the Kelso Dunes, the Bristol Trough corridor, which includes the Cadiz and Danby dunes, the Rice Valley corridor, which includes the Rice Valley Dunes, and the Clark's Pass corridor, which includes the Dale Lake Dunes and Palen-Ford Dunes (USGS 2003). Renewable energy facilities in these DFAs could impede sand transport and affect valuable habitat within this corridor of active sand dunes. Within DFAs in the Preferred Alternative, there are approximately 79,000 acres of dune systems and sand transport corridors.

Impact SG-3: Expose structures to damage from corrosive or expansive soils.

As stated in Section IV.4.2.1.2, Typical Impacts, corrosive soils could damage foundations and structural elements of renewable energy facilities. Expansive soils could cause soils to shrink or swell, damaging foundations and other structural elements. The Preferred Alternative includes approximately 16,000 acres of potentially expansive soils. See Table R2.4-3, Acreage of Expansive Soil Textures Within DFAs for Each Alternative (Appendix R2), which defines areas of clay, clay loam, silty clay, and silty clay loam. Corrosive soils are widespread throughout the DRECP area. Playas and North American warm desert alkaline scrub, herb playa, and wet flat all indicate potentially corrosive soil within the DRECP area. The Preferred Alternative includes approximately 18,000 acres of potentially corrosive soils within the DFAs.

Impact SG-4: Destroy or disturb desert pavement.

Renewable energy facilities in the Preferred Alternative may damage desert pavement. Excavation and grading during construction and decommissioning, as well as ground disturbance from workers, vehicles, and equipment, would damage or disturb this important habitat. Specific locations of desert pavement that have not been mapped would require field surveys.

Impacts on Variance Process Lands

Variance Process Lands are neither reserve lands nor DFAs. They are a subset of the variance lands identified in the Solar PEIS Record of Decision and additional lands that, based on current information, have moderate to low ecological value and ambiguous value for renewable energy. If renewable energy development occurs on Variance Process Lands, LUPA would not be required, so the environmental review process would be simpler than if the location were left as undesignated.

Variance Process Lands for each alternative are as shown in Chapter IV.1, Table IV.1-2, and in Volume II, Chapter II.3, Figure II.3-1 for the Preferred Alternative. Development of the Variance Process Lands would have similar air quality effects as described under Impacts SG-1 through SG-4.

Impact Reduction Strategies

Implementation of the Proposed LUPA would enhance conservation of many BLM-administered public lands, as well as the development of renewable energy generation and transmission facilities on other lands. The impacts of renewable energy development covered in the DRECP would be lessened in several ways. First, it incorporates Conservation and Management Actions (CMAs) for each alternative, including LUPA-wide CMAs and CMAs for specific land designations such as Natural Landscape Conservation System (NLCS) lands, ACECs, and wildlife allocations. Also, the implementation of existing laws, orders, regulations, and standards would reduce the impacts of project development.

Conservation and Management Actions

The conservation strategy for the Preferred Alternative (presented in Volume II, Section II.3.4) defines specific actions that would reduce the impacts of this alternative. The conservation strategy includes specific land designations and CMAs for the Preferred Alternative. This section presents summaries of relevant CMAs that would reduce impacts to geology and soils. The full text of all CMAs is presented in Section II.3.4.2.

CMAs for the Preferred Alternative for Geology and Soils

LUPA-SW-2: Buffer zones, setbacks, and activity limitations directly associated with soil and water resources, not including the biological associated or dependent resources will be determined on a site-specific basis, consistent with the LUPA protection goals for these resources. In general, placement of long-term facilities within buffers or protected zones will be discouraged.

LUPA-SW-8: As determined necessary on an activity specific basis, prepare a site plan specific to major soil types present (≥5% of footprint or laydown surfaces) in Wind Erodibility Groups 1 and 2 and in Hydrology Soil Class D as defined by the USDA Natural Resource Conservation Service to minimize water and air erosion from disturbed soils on activity sites.

LUPA-SW-9: The extent of desert pavement within the proposed boundary of an activity shall be mapped if it is anticipated that the activity may create erosional or ecologic impacts. Disturbance of desert pavement within the boundary of an activity shall be limited to the extent possible, and shall not exceed 10% of the desert pavement mapped within the activity boundary without BLM approval.

LUPA-SW-10: The extent of additional sensitive soil areas (cryptobiotic soil crusts, hydric soils, highly corrosive soils, expansive soils, and soils at severe risk of erosion) shall be mapped if it is anticipated that an activity will impact these resources. To the extent possible, avoid disturbance of desert biologically intact soil crusts, and soils highly susceptible to wind and water erosion.

Biological CMAs Relevant to Geology and Soils

LUPA-BIO-7: This CMA requires restoration of temporary disturbance areas, such as construction areas for pipelines and transmission, staging areas, and construction-related roads. Restoration activities include the restoration, reclamation, and revegetation of temporarily disturbed areas.

LUPA-BIO-8: General closure and decommissioning of activity sites must include appropriate restoration measures such as recontouring, the installation of erosion control measures, and the restoration of vegetation and soil profiles.

LUPA-BIO-9: The protection of water dependent species through this CMA would require implementation of activity specific drainage, erosion, and sedimentation control actions, the maintenance of natural drainages and hydrologic function, the reduction of impervious surfaces, the use of retention basins as appropriate. This CMA also requires the stabilization of

disturbed areas, the minimization of wind and water erosion, and the maintenance of long-term erosion control measures.

LUPA-BIO-13: General siting and design criteria in this CMA would maximize the use of existing roads, routes, and utility corridors, and would minimize new disturbance areas.

LUPA-BIO-15: Use state-of-the-art construction and installation techniques that minimize new site disturbance, soil erosion and deposition, soil compaction, disturbance to topography, and removal of vegetation.

LUPA-BIO-DUNE-1: For activities that potentially occur within or bordering Aeolian and sand transport corridors, complete studies to verify the accuracy of the DRECP dunes and sand resources mapping, as shown in Appendix H, and to determine if a proposed activity would interfere with a sand transport corridor.

LUPA-BIO-DUNE-2: Activities that potentially affect the amount of sand entering or transported within Aeolian transport corridors will be designed and operated to minimize interference with these processes.

LUPA-BIO-DUNE-3: Any facilities or activities that alter site hydrology (e.g., sediment barrier) will be designed to maintain continued sediment transport and deposition in the Aeolian corridor in a way that maintains the Aeolian sorting and transport to downwind deposition zones. Site designs for maintaining this transport function must be approved by BLM in coordination with USFWS and CDFW as appropriate.

DFA-VPL-BIO-DUNE-2: Within Aeolian corridors that transport sand to dune formations and vegetation types downwind inside and outside of the DFAs, all activities will be designed and operated to facilitate the flow of sand across activity sites, and avoid the trapping or diverting of sand from the Aeolian corridor. Buildings and structures within the site will take into account the direction of sand flow and, to the extent feasible, build and align structures to allow sand to flow through the site unimpeded. Fences will be designed to allow sand to flow through and not be trapped.

Air Resources CMAs Relevant to Geology and Soils

LUPA-AIR-5: A fugitive Dust Control Plan will be developed for all projects where the NEPA analysis shows an impact to air quality from fugitive dust.

Laws and Regulations

Similar to the No Action Alternative, existing laws and regulations will reduce certain impacts of DRECP implementation. Relevant regulations are presented in the Regulatory

Setting in Volume III, Section III.4.1. The requirements of relevant laws and regulations are summarized for the No Action Alternative in Section IV.4.3.1.1.

IV.4.3.2.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

The conservation designations included in the Preferred Alternative would total 4,926,000 acres (see Chapter IV.1, Table IV.1-1, Summary of Alternative Components). This would protect soil resources by limiting development within the DRECP area, which could also reduce potential effects from geologic hazards.

IV.4.3.2.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside of the DRECP area on geology and soils would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.4.3.1.3, Impacts of Transmission Outside the DRECP Area.

IV.4.3.2.4 Comparison of the Preferred Alternative With No Action Alternative

Under the No Action Alternative, development would continue under existing BLM land designations and protective requirements, including those of the Solar PEIS. Development would be more constrained under the Preferred Alternative because LUPA would encourage development within DFAs and prohibit development within expansive conservation areas. Therefore, potential impacts from soil erosion and loss of desert pavement would be more severe under the No Action Alternative.

Table IV.4-3 compares the Preferred Alternative with the No Action Alternative for each of the measurable factors in this analysis.

Table IV.4-3
Comparison of Preferred Alternative With No Action Alternative

Comparison Factor	Preferred Alternative	No Action Alternative
Miles of active fault lines within DFAs	10	90
Miles of active fault lines within 25 miles of DFA boundaries	800	800
Acres of soils with moderate-to-high potential for wind erosion	210,000	1,451,000
Acres of soils with moderate-to-high potential for water erosion	107,000	795,000
Acres of sand and sand transport corridors in DFAs	79,000	307,000

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals ; therefore, the subtotals may not sum to the total within the table.

Geographic Distinctions. Many impacts to geology and soils could occur throughout the DRECP area. In the Preferred Alternative, significant dune systems and sand transport corridors occur within DFAs in the East Riverside area, specifically along I-10. Active faults are concentrated primarily in DFAs in the Imperial Borrego Valley, West Mojave and Eastern Slopes, and Panamint Death Valley ecoregion subareas.

IV.4.3.3 Alternative 1

Alternative 1 includes 81,000 acres of total DFAs, approximately 7.6 million acres of existing conservation within the DRECP area, and approximately 4.9 million acres of BLM LUPA conservation designations.

Under Alternative 1, dispersed solar development is anticipated for the Cadiz Valley and Chocolate Mountains, Imperial Borrego Valley, Owens River Valley, Pinto Lucerne Valley and Eastern Slopes, and West Mojave and Eastern Slopes ecoregion subareas. Dispersed wind development is anticipated in the Cadiz Valley and Chocolate Mountains and the Pinto Lucerne Valley and Eastern Slopes ecoregion subareas. Dispersed geothermal development is anticipated in the Imperial Borrego Valley ecoregion subarea.

IV.4.3.3.1 Impacts of Renewable Energy and Transmission Development

Under Alternative 1, DFAs are primarily in the Cadiz Valley and Chocolate Mountains, Imperial Borrego Valley, Owens River Valley, and Pinto Lucerne Valley and Eastern Slopes ecoregion subareas. Impacts related to soils, geology, and geologic hazards would result from development of solar, wind, geothermal, and transmission facilities, both within and outside of DFAs.

The potential for soil erosion can be quantified based on acreage of erosive soils that may be disturbed during construction and decommissioning, as well as, to a lesser degree, during site characterization. The potential for impacts from geologic hazards can be quantified based on miles of active fault lines within 25 miles of DFAs in Alternative 1. Other geologic and soil impacts such as disturbance to desert pavement and structural damage from expansive or corrosive soils are assessed qualitatively.

Proposed BLM land use designations (e.g., National Conservation Lands, ACECs, wildlife allocations, and trail management corridors) would prohibit renewable energy development and be managed to protect ecological, historic, cultural, scenic, and scientific resources and values; this would additionally provide general protection for geologic and soil resources. Disturbance caps on National Conservation Lands and ACECs would provide further protections. ACECs would make up the majority of the proposed BLM land designations under Alternative 1.

Existing or expanded SRMAs would also prohibit surface-occupying renewable energy development, but could also conversely cause soil erosion from recreation uses, depending on the extent of allowable uses and management within specific SRMAs.

Impact SG-1: Expose people or structures to injury or damage from seismic, volcanic, or landslide activity.

As described in Volume III, Section III.4.3, the DRECP area is seismically and volcanically active, with major fault lines, young volcanic features, and landslide sediment deposits. Within the DRECP area, major faults include some of the largest in the state, including the San Andreas and San Jacinto faults. During the life of a renewable energy facility, earthquakes within the DRECP area are likely. Table IV.4-4 shows major active faults, which the USGS defines as having ruptured within the Holocene (the past 11,000 years) (USGS 2014[a]).

For each fault, Table IV.4-4 shows its length within the DFA boundary and its length outside the DFA but within 25 miles of the DFA boundary. Under Alternative 1, 0.1 mile of active fault lines is within DFAs and 680.5 miles are outside DFAs but within the 25-mile buffer set for this fault analysis. See Volume III, Table III.4-2 for the earthquake magnitude potential for each of the listed faults and their associated Alquist-Priolo designations. The faults presented in Table IV.4-4 represent a potential geologic hazard that could damage renewable energy facilities. While the majority of these facilities would not include occupied residential structures, damage to property could still be considerable.

Table IV.4-4
Faults Within a 25-Mile Radius of DFAs in Alternative 1

Fault Name	Length of Fault Within DFAs (miles)	Length of Fault Outside DFAs (miles)
Blackwater Fault		13.3
Bullion Fault		17.5
Calico Fault Zone		29.4
Coyote Creek Fault		29.6
Elsinore Fault Zone		16.8
Emerson Fault		30.3
Garlock Fault Zone	0.1	106.9
Gravel Hills - Harper Fault Zone		26.2
Helendale Fault		30.7
Johnson Valley Fault		37.6
Laguna Salada Fault Zone		19.7
Lenwood Fault		44.2
Lockhart Fault		3.9

Table IV.4-4
Faults Within a 25-Mile Radius of DFAs in Alternative 1

Fault Name	Length of Fault Within DFAs (miles)	Length of Fault Outside DFAs (miles)
Owens Valley Fault Zone		30.0
Pinto Mountain Fault		17.5
San Andreas Fault Zone		109.7
San Bernardino Fault		29.3
San Jacinto Fault Zone		56.5
West Calico Fault		21.0
White Wolf Fault		10.5
Grand Total	**0.1**	**680.5**

Source: USGS 2014b.

Volume III, Section III.4.4.4, describes the locations of recent volcanic activity. Within DFAs in Alternative 1, there is very little area of recent (Holocene) volcanic flow rocks. Developers would avoid locating renewable energy facilities near an active volcanic site, so facility damage or threat to life would be possible but unlikely.

Impact SG-2: Trigger or accelerate soil or sand erosion.

Erosion. Table R2.4-2, Acreage of Erosive Soils Within DFAs for Each Alternative, (Appendix R2) presents the erosion potential of soil textures found in the DRECP area and the acreage of soil textures with moderate to high potential for erosion in DFAs for each alternative. Within DFAs in Alternative 1, there are 44,000 acres of soils with a moderate to high potential for wind erosion and 41,000 acres of soils with a moderate to high potential for water erosion. Development of renewable energy facilities within these DFAs in Alternative 1 would increase the likelihood of soil erosion from wind and water.

Sand Transport. In Alternative 1, DFAs in the East Riverside region are on or near an important sand transport corridor in the Chuckwalla Valley. The corridor runs parallel to I-10 in Riverside County between Desert Center and Blythe. Other sand transport corridors include the Mojave River corridor, which includes the Kelso Dunes, the Bristol Trough corridor, which includes the Cadiz and Danby dunes, the Rice Valley corridor, which includes the Rice Valley Dunes, and the Clark's Pass corridor, which includes the Dale Lake Dunes and Palen-Ford Dunes (USGS 2003). Renewable energy facilities in these DFAs could impede sand transport and affect valuable habitat within this corridor of active sand dunes. Within DFAs in Alternative 1, there are approximately 15,000 acres of dune systems and sand transport corridors.

Impact SG-3: Expose structures to damage from corrosive or expansive soils.

As stated in Section IV.4.2.1, corrosive soils could damage foundations and other structural elements of renewable energy facilities. Expansive soils could cause soils to shrink or swell, also damaging foundations and structural elements. Alternative 1 includes 343,000acres of potentially expansive soils. See Table R2.4-3, Acreage of Expansive Soil Textures Within Developable Areas for Each Alternative (Appendix R2), which includes clay, clay loam, silty clay, and silty clay loam. Playas, North American warm desert alkaline scrub, herb playa, and wet flat all indicate potentially corrosive soil within the DRECP area. Alternative 1 includes approximately 90 acres of potentially corrosive soils within DFAs.

Impact SG-4: Destroy or disturb desert pavement.

Renewable energy facilities constructed in DFAs under Alternative 1 may damage desert pavement. Excavation and grading during construction and decommissioning, as well as ground disturbance from workers, vehicles, and equipment, would damage or disturb this important habitat. Specific locations of desert pavement that have not yet been mapped would require field surveys.

Impacts on Variance Process Lands

Variance Process Lands are neither reserve lands nor DFAs. They are a subset of the variance lands identified in the Solar PEIS Record of Decision and additional lands that, based on current information, have moderate to low ecological value and ambiguous value for renewable energy. If renewable energy development is built on Variance Process Lands LUPA would not be required, so the environmental review process would be simpler than if the location were left as undesignated.

Variance Process Lands for each alternative are shown in Chapter IV.1, Table IV.1-2 and in Volume II, Chapter II.4, Figure II.4-1, for Alternative 1. Development of Variance Process Lands would have similar air quality effects as described under Impacts SG-1 through SG-4.

Impact Reduction Strategies

Implementation of the Proposed LUPA would result in new conservation designations for many acres of desert lands as well as for development of renewable energy generation and transmission on other lands. The impacts of this development would be lessened in several ways. First, LUPA incorporates CMAs for each alternative. The implementation of existing laws, orders, regulations, and standards would also reduce the impacts of project development.

Conservation and Management Actions

The CMAs for Alternative 1 (presented in Volume II, Section II.4.4) define specific actions that would reduce the impacts of this alternative. Section II.4.4.2, presents specific CMAs for Alternative 1. The CMAs in Alternative 1 that are relevant to geology and soils would be the same as the CMAs for the Preferred Alternative that are presented in Section IV.4.3.2.1, except as described below.

All of the CMAs that are described for the Preferred Alternative would apply to Alternative 1, with the following modifications for activities within DFAs:

- Limit disturbance of sensitive soil areas so that no more than 1% of sensitive soil areas within a proposed project footprint would be disturbed by construction.
- Exclude renewable energy development that would disturb sand dunes.
- Limit disturbance of sand flow corridors so that no more than 1% of sand flow corridors within a proposed project footprint would disturbed by construction.
- Limit disturbance of desert pavement so that no more than 5% of desert pavement within a proposed project footprint would be disturbed by construction.
- Avoid development in flood plains, unless its effects can be mitigated.
- Create a 0.25-mile protective offset around playas.

Laws and Regulations

As defined under the No Action Alternative, existing laws and regulations will reduce certain impacts of Plan implementation as summarized in Section IV.4.3.1.1. Relevant regulations are described in more detail in Volume III, Section III.4.1, Regulatory Setting.

IV.4.3.3.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

The conservation designations proposed in Alternative 1 would total 4,863,000 acres (see Chapter IV.1, Table IV.1-1, Summary of Alternative Components). This would protect soil resources by limiting both development within the DRECP area and the amount of land available for development, which would also reduce potential geologic hazards.

IV.4.3.3.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside of the DRECP area on geology and soils would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.4.3.1.3, Impacts of Transmission Outside the DRECP Area.

IV.4.3.3.4 Comparison of Alternative 1 with Preferred Alternative

The impacts of renewable energy on BLM lands under LUPA for Alternative 1 would be less than under the Preferred Alternative. LUPA land designations under Alternative 1 would offer similar protection to soil resources as those under the Preferred Alternative; however, CMAs under Alternative 1 would have stricter limits on disturbance to sand flow corridors, desert pavements, and sensitive soils.

Table IV.4-5 compares Alternative 1 with the Preferred Alternative for each of the measurable factors included in this analysis.

Table IV.4-5
Comparison of Alternative 1 With the Preferred Alternative

Comparison Factor	Alternative 1	Preferred Alternative
Miles of active fault lines within DFAs	0	10
Miles of active fault lines within 25 miles of DFA boundaries	700	800
Acres of soils with moderate to high potential for wind erosion	44,000	210,000
Acres of soils with moderate to high potential for water erosion	41,000	107,000
Acres of sand and sand transport corridors in DFAs	15,000	79,000

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals ; therefore, the subtotals may not sum to the total within the table.

Geographic Distinctions. Many impacts related to geology and soils could occur throughout the DRECP area so are not useful in distinguishing one alternative from another. Under Alternative 1, there are fewer acres in DFAs in eastern Riverside County. Therefore, fewer areas of dune systems and sand transport corridors are within DFAs in this region. In this alternative, active faults are concentrated primarily in the DFAs within the West Mojave and Eastern Slopes ecoregion subarea.

IV.4.3.4 Alternative 2

Under Alternative 2, renewable energy projects would be encouraged within DFAs. Alternative 2 includes 718,000 acres of total DFAs, which is approximately 7.6 million acres of existing conservation within the DRECP area and approximately 5.2 million acres of BLM LUPA conservation designations. In Alternative 2, solar development is located primarily in the Cadiz Valley and Chocolate Mountains, Imperial Borrego Valley, and West Mojave and Eastern Slopes ecoregion subareas. Wind development is located primarily in the Cadiz Valley and Chocolate Mountains and Imperial Borrego Valley ecoregion subareas.

Dispersed geothermal development is anticipated in the Imperial Borrego Valley and the Owens River Valley ecoregion subareas.

IV.4.3.4.1 Impacts of Renewable Energy and Transmission Development

Under Alternative 2, DFAs are located primarily in the Cadiz Valley and Chocolate Mountains ecoregion subarea, the Imperial Borrego Valley ecoregion subarea, and the West Mojave and Eastern Slopes ecoregion subarea. Impacts to soils, geology, and geologic hazards would occur within the DRECP area from development of solar, wind, geothermal, and transmission facilities, both within and outside of DFAs.

The potential for soil erosion can be quantified based on acreage of erosive soils that may be disturbed during construction and decommissioning and, to a lesser degree, during site characterization. The potential for impacts from geologic hazards can be quantified based on miles of active fault lines within 25 miles of DFAs in Alternative 2. Other geologic and soil impacts such as disturbance to desert pavement and structural damage from expansive or corrosive soils are assessed qualitatively

Impact SG-1: Plan components would expose people or structures to injury or damage from seismic, volcanic, or landslide activity.

As described in Volume III, Section III.4.3, the DRECP area is seismically and volcanically active, with major fault lines, young volcanic features, and landslide sediment deposits. Within the DRECP area, major faults include some of the largest in the state, including the San Andreas and San Jacinto faults. During the lifetime of a renewable energy facility, earthquakes within the DRECP area are likely. Table IV.4-6 shows major active faults, which the USGS defines as having ruptured within the Holocene (the past 11,000 years) (USGS 2014a). For each fault, Table IV.4-6 presents its length within the DFA boundary and its length outside the DFA but within 25 miles of the DFA boundary. In Alternative 2, 9.5 miles of active fault lines are within DFAs and 818.3 miles are outside of DFAs but within the 25-mile buffer set for this fault analysis. See Volume III, Table III.4-2, for the earthquake magnitude potential for each of the listed faults and associated Alquist-Priolo designations. The faults presented in Table IV.4-6 represent a potential geologic hazard that could damage renewable energy facilities. While the majority of these facilities would not include occupied residential structures, damage to property could still be considerable.

Table IV.4-6
Faults Within a 25-Mile Radius of DFAs in Alternative 2

Fault Name	Length of Fault Within DFAs (miles)	Length of Fault Outside DFAs (miles)
Blackwater Fault		13.3
Bullion Fault		20.4
Calico Fault Zone		29.4
Coyote Creek Fault		29.6
Elsinore Fault Zone		16.8
Emerson Fault		30.3
Garlock Fault Zone	3.4	136.2
Gravel Hills - Harper Fault Zone		26.2
Helendale Fault	0.0	30.7
Johnson Valley Fault	1.9	35.8
Laguna Salada Fault Zone		19.7
Lenwood Fault	1.0	43.2
Lockhart Fault		3.9
Mill Creek Fault		22.9
Owens Valley Fault Zone	1.2	30.4
Panamint Valley Fault Zone		35.0
Pinto Mountain Fault		31.9
San Andreas Fault Zone	2.2	132.1
San Bernardino Fault		31.7
San Jacinto Fault Zone		56.5
West Calico Fault		21.0
White Wolf Fault		21.4
Grand Total	**9.5**	**818.3**

Source: USGS 2014b.

Volume III, Section III.4.4.4, describes the locations of recent volcanic activity. Within DFAs in Alternative 2, there is very little area of recent volcanic flow rocks. The likelihood of a renewable energy facility being located in the immediate area of an active volcanic site is low, so facility damage or threat to life is possible but unlikely.

Impact SG-2: Trigger or accelerate soil or sand erosion.

Erosion. Table R2.4-2, Acreage of Erosive Soils Within DFAs for Each Alternative (Appendix R2), presents the erosion potential of soil textures found in the DRECP area and acreage of soil textures with moderate to high potential for erosion found in DFAs in each alternative. On BLM-administered public lands in Alternative 2 there are approximately

420,000 acres of soils with a moderate to high potential for wind erosion and approximately 219,000 acres of soils with a moderate to high potential for water erosion. Development of renewable energy facilities within these areas of DFAs in Alternative 2 would increase the likelihood of soil erosion from wind and water.

Sand Transport. Under Alternative 2, development in the East Riverside region are either on or near an important sand transport corridor in the Chuckwalla Valley. The corridor runs parallel to I-10 in Riverside County between the areas of Desert Center and Blythe. Other sand transport corridors include the Mojave River corridor (including the Kelso Dunes), the Bristol Trough corridor (including the Cadiz and Danby dunes), the Rice Valley corridor (including the Rice Valley Dunes), and the Clark's Pass corridor (including the Dale Lake Dunes and Palen-Ford Dunes) (USGS 2003). Renewable energy facilities in these DFAs could impede sand transport and affect valuable habitat within this corridor of active sand dunes. Within DFAs in Alternative 2, there are approximately 107,000 acres of dune systems and sand transport corridors.

Impact SG-3: Expose structures to damage from corrosive or expansive soils.

As stated in Section IV.4.2, Typical Impacts Common to All Action Alternatives, corrosive soils could damage foundations and structural elements of renewable energy facilities. Expansive soils could shrink or swell, also damaging foundations and structural elements. Alternative 2 includes approximately 29,000 acres of potentially expansive soils in DFAs. See Table R2.4-3, Acreage of Expansive Soil Textures Within DFAs for Each Alternative (Appendix R2), which includes clay, clay loam, silty clay, and silty clay loam. Playas, North American warm desert alkaline scrub, herb playa, and wet flat all indicate potentially corrosive soil. Alternative 2 includes approximately 21,000 acres of potentially corrosive soils.

Impact SG-4: Destroy or disturb desert pavement.

Renewable energy facilities constructed in DFAs in Alternative 2 may damage desert pavement. Excavation and grading during construction and decommissioning, as well as ground disturbance from workers, vehicles, and equipment, would damage or disturb this important habitat. Specific locations of desert pavement that have not been mapped would require field surveys.

Impacts on Variance Process Lands

Variance Process Lands are neither reserve lands nor DFAs. They are a subset of the variance lands identified in the Solar PEIS Record of Decision and additional lands that, based on current information, have moderate to low ecological value and ambiguous value for renewable energy. If renewable energy development is built on Variance Process Lands,

LUPA would not be required, so the environmental review process would be simpler than if the location were left as undesignated.

Variance Process Lands for each alternative are shown in Chapter IV.1, Table IV.1-2, and in Volume II, Chapter II.5, Figure II.5-1, for Alternative 2. Development of the Variance Process Lands would have similar air quality effects as described under Impacts SG-1 through SG-4.

Impact Reduction Strategies

Implementation of the Proposed LUPA would both conserve some desert lands and develop development renewable energy projects on other lands. The impacts of the renewable energy development covered under LUPA would be lessened in several ways. First, the DRECP incorporates CMAs for each alternative, including LUPA-wide CMAs and CMAs for specific land designations such as NLCS lands, ACECs, and wildlife allocations. Also, the implementation of existing laws, orders, regulations, and standards would reduce the impacts of project development.

Conservation and Management Actions

The conservation strategy for Alternative 2 (presented in Volume II, Section II.5.4) defines specific actions that would reduce the impacts of this alternative. Section II.5.4.2 presents specific CMAs for Alternative 2. The CMAs in Alternative 2 relevant to geology and soils would be the same as the CMAs for the Preferred Alternative presented in Section IV.4.3.2.1, except as described below.

Unlike the Preferred Alternative, this alternative would not implement CMA LUPA-BIO-13. All of the remaining CMAs described for the Preferred Alternative would apply as well to Alternative 2, with the following modifications for activities within DFAs:

- Limit disturbance of sensitive soil areas so that no more than 20% of the sensitive soil areas within a proposed project footprint would be disturbed by construction.
- Limit disturbance of sand dune areas so that no more than 5% of sand dune areas within a proposed project footprint would be disturbed by construction.
- Limit disturbance of sand flow corridors so that no more than 5% of sand flow corridors within a proposed project footprint would be disturbed by construction.
- Limit disturbance of desert pavement so that no more than 5% of desert pavement within a proposed project footprint would be disturbed by construction.

- Avoid development in a flood plain unless it can be mitigated.
  - **Exceptions:** Exceptions to any of these stipulations may be granted by the authorized officer if the operator submits a plan that demonstrates that:
    - The impacts from the proposed action are temporary.
    - The impacts are minimal or can be adequately mitigated.
    - Critical resources, including threatened and endangered species, are fully protected.
  - **Modifications:** No modifications will be granted.
  - **Waivers:** No waivers will be granted.

Biological and Air Resources CMAs relevant to geology and soils under the Preferred Alternative apply to Alternative 2 as well.

Laws and Regulations

Similar to the No Action Alternative, existing laws and regulations will reduce certain impacts of Plan implementation; they are summarized in Section IV.4.3.1.1. The requirements of relevant regulations are described in more detail in Volume III, Section III.4.1, Regulatory Setting.

IV.4.3.4.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

The conservation designations under Alternative 2 would total 4,863,000 acres (see Chapter IV.1, Table IV.1-1, Summary of Alternative Components). This would protect soil resources by limiting both development within the DRECP area and the amount of developable land.

IV.4.3.4.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside of the DRECP area on geology and soils would be the same under all alternatives. These impacts are described for the No Action Alternative in Section IV.4.3.1.3, Impacts of Transmission Outside the DRECP Area.

IV.4.3.4.4 Comparison of Alternative 2 With Preferred Alternative

Table IV.4-7 compares Alternative 2 with the Preferred Alternative for each of the measurable factors included in this analysis.

Table IV.4-7
Comparison of Alternative 2 With the Preferred Alternative

Comparison Factor	Alternative 2	Preferred Alternative
Miles of active fault lines within DFAs	10	10
Miles of active fault lines within 25 miles of DFA boundaries	800	800
Acres of soils with moderate-to-high potential for wind erosion	420,000	210,000
Acres of soils with moderate-to-high potential for water erosion	219,000	107,000
Acres of sand and sand transport corridors in DFAs	107,000	79,000

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals ; therefore, the subtotals may not sum to the total within the table.

Geographic Distinctions. Many impacts related to geology and soils could occur throughout the DRECP area so it is not useful to distinguish one alternative from another. In Alternative 2, DFAs in the eastern Riverside County area are similar in size but slightly more extensive than DFAs in the Preferred Alternative. Significant dune systems and an important sand transport corridor are located within this area, specifically along I-10. In this alternative, active faults are concentrated in DFAs in the Mojave and Silurian Valley, Panamint Death Valley, West Mojave and Eastern Slopes, Pinto Lucerne Valley and Eastern Slopes, and Imperial Borrego Valley ecoregion subareas.

IV.4.3.5 Alternative 3

In Alternative 3, activities associated with solar, wind, and geothermal development and operation would be streamlined within DFAs. Alternative 3 includes 211,000 acres of total DFAs, approximately 7.6 million acres of existing conservation within the DRECP area, and approximately 5.0 million acres of BLM LUPA conservation designations.

In Alternative 3, dispersed solar development is anticipated for the West Mojave and Eastern Slopes ecoregion subarea, the Cadiz Valley and Chocolate Mountains ecoregion subarea, and the Imperial Borrego Valley ecoregion subarea. Dispersed wind development is anticipated in the Pinto Lucerne Valley and Eastern Slopes ecoregion subarea and the Cadiz Valley and Chocolate Mountains ecoregion subarea. Dispersed geothermal development is anticipated in the Imperial Borrego Valley and the Owens River Valley ecoregion subareas.

IV.4.3.5.1 Impacts of Renewable Energy and Transmission Development

Under Alternative 3, DFAs are located primarily in the Imperial Borrego Valley and Cadiz Valley and Chocolate Mountains ecoregion subareas. Impacts to soils, geology, and geologic hazards would occur within the DRECP area from development of solar, wind, and geothermal facilities.

The potential for soil erosion can be quantified based on acreage of erosive soils that may be disturbed during construction and decommissioning and, to a lesser degree, during site characterization. The potential for impacts from geologic hazards can be quantified based on miles of active fault lines within 25 miles of DFAs. Other soils and geologic impacts such as disturbance to desert pavement and structural damage from expansive or corrosive soils are assessed qualitatively.

Impact SG-1: Expose people or structures to injury or damage from seismic, volcanic, or landslide activity.

As described in Volume III, Section III.4.3, the DRECP area is seismically and volcanically active, with major fault lines, young volcanic features, and landslide sediment deposits. Within the DRECP area, major faults include some of the largest in the state, including the San Andreas and San Jacinto faults. During the lifetime of a renewable energy facility, earthquakes within the DRECP area are likely. Table IV.4-8 shows major active faults, which the USGS defines as having ruptured within the Holocene (the past 11,000 years) (USGS 2014[a]).

For each fault, Table IV.4-8 shows its length within the DFA boundary and its length outside the DFA but within 25 miles of the DFA boundary. In Alternative 3, there are 3.4 miles of active fault lines within DFAs and 743.6 miles outside of DFAs but within the 25-mile buffer set for this fault analysis. See Table III.4-2, Largest Faults Within the DRECP Area, for the earthquake magnitude potential for each of the listed faults and their associated Alquist-Priolo designations. The faults presented in Table IV.4-8 represent a potential geologic hazard that could damage renewable energy facilities. While the majority of these facilities would not include occupied residential structures, damage to property could still be considerable.

Table IV.4-8
Faults Within a 25-Mile Radius of DFAs in Alternative 3

Fault Name	Length of Fault Within DFAs (miles)	Length of Fault Outside DFAs (miles)
Blackwater Fault		13.3
Bullion Fault		20.4
Calico Fault Zone		29.4

Table IV.4-8
Faults Within a 25-Mile Radius of DFAs in Alternative 3

Fault Name	Length of Fault Within DFAs (miles)	Length of Fault Outside DFAs (miles)
Coyote Creek Fault		29.6
Elsinore Fault Zone		16.8
Emerson Fault		30.3
Garlock Fault Zone	1.2	125.5
Gravel Hills - Harper Fault Zone		26.2
Helendale Fault	0.0	30.7
Johnson Valley Fault		37.6
Laguna Salada Fault Zone		19.7
Lenwood Fault	0.1	44.1
Lockhart Fault		3.9
Owens Valley Fault Zone		31.5
Panamint Valley Fault Zone		34.7
Pinto Mountain Fault		21.7
San Andreas Fault Zone	2.2	116.2
San Bernardino Fault		29.3
San Jacinto Fault Zone		56.5
West Calico Fault		21.0
White Wolf Fault		5.2
Grand Total	**3.4**	**743.6**

Source: USGS 2014b.

Volume III, Section III.4.4.4, describes the locations of recent volcanic activity. Within DFAs in Alternative 3, there is very little area of recent volcanic flow rocks. The likelihood of a renewable energy developer locating a project near an active volcanic site is low, so facility damage or threat to life possible but unlikely.

Impact SG-2: Trigger or accelerate soil or sand erosion.

Erosion. Table R2.4-2, Acreage of Erosive Soils Within DFAs for Each Alternative (Appendix R2) show the erosion potential of soil textures and acreage of soil textures with moderate to high potential for erosion in DFAs for each alternative. Within DFAs on BLM-administered public lands in Alternative 3, there are approximately 130,000 acres of soils with moderate to high potential for wind erosion and approximately 88,000 acres of soils with moderate to high potential for water erosion. Development of renewable energy facilities within these areas of DFAs in Alternative 3 would increase the likelihood of soil erosion from wind and water.

Sand Transport. Under Alternative 3, DFAs in the East Riverside region are on or near an important sand transport corridor in the Chuckwalla Valley. The corridor runs parallel to I-10 in Riverside County between Desert Center and Blythe. Other sand transport corridors include the Mojave River corridor, which includes the Kelso Dunes, the Bristol Trough corridor, which includes the Cadiz and Danby dunes, the Rice Valley corridor, which includes the Rice Valley Dunes, and the Clark's Pass corridor, which includes the Dale Lake Dunes and Palen-Ford Dunes (USGS 2003). Renewable energy facilities in these DFAs could impede sand transport and affect valuable habitat within this corridor of active sand dunes. Within DFAs in Alternative 3, there are approximately 32,000 acres of dune systems and sand transport corridors.

Impact SG-3: Expose structures to damage from corrosive or expansive soils.

As stated in Section IV.4.2, Typical Impacts Common to All Action Alternatives, corrosive soils could damage foundations and structural elements of renewable energy facilities. Expansive soils could cause soils to shrink or swell, also damaging foundations and structural elements. Alternative 3 includes 15,000 acres of potentially expansive soils. See Table R2.4-3, Acreage of Expansive Soil Textures Within DFAs for Each Alternative (Appendix R2), which includes clay, clay loam, silty clay, and silty clay loam. Playas, North American warm desert alkaline scrub, herb playa, and wet flat all indicate potentially corrosive soil. Alternative 3 includes approximately 15,000 acres of potentially corrosive soils within DFAs.

Impact SG-4: Destroy or disturb desert pavement.

Renewable energy facilities in Alternative 3 may damage desert pavement. Excavation and grading during construction and decommissioning, as well as ground disturbance from workers, vehicles, and equipment, would damage or disturb this important habitat. Specific locations of desert pavement that have not been mapped would require field surveys.

Impacts on Variance Process Lands

Variance Process Lands are neither reserve lands nor DFAs. They are a subset of the variance lands identified in the Solar PEIS Record of Decision and additional lands that, based on current information, have moderate to low ecological value and ambiguous value for renewable energy. If renewable energy development is built on Variance Process Lands, a LUPA would not be required, so the environmental review process would be simpler than if the location were left as undesignated.

Variance Process Lands for each alternative are shown in Chapter IV.1, Table IV.1-2, and in Volume II, Chapter II.6, Figure II.6-1, for Alternative 3. Development of Variance Process Lands would have similar air quality effects as described under Impacts SG-1 through SG-4.

Impact Reduction Strategies

Implementation of the Proposed LUPA would result in new conservation designations for some lands as well as the designation of areas for renewable energy generation and transmission facilities. The impacts of the renewable energy development covered by the LUPA would be lessened in several ways. First, the LUPA incorporates CMAs for each alternative, including LUPA-wide CMAs and CMAs for specific land designations, such as NLCS lands, ACECs, and wildlife allocations. Also, the implementation of existing laws, orders, regulations, and standards would reduce the impacts of project development.

Conservation and Management Actions

The conservation strategy for Alternative 3 (presented in Volume II, Section II.6.4) defines specific actions that would reduce the impacts of this alternative. Section II.6.4.2 presents specific CMAs for Alternative 3. The CMAs in Alternative 3 that are relevant to geology and soils would be the same as the CMAs for the Preferred Alternative that are presented in Section IV.4.3.2.1, except as described below.

All of the CMAs that are described for the Preferred Alternative would apply to Alternative 3, with the following modifications for activities within DFAs:

- Limit disturbance of sensitive soil areas so no more than 1% of the sensitive soil areas within a proposed project footprint shall be disturbed for construction.
- Exclude renewable energy development in sand dune areas.
- Limit disturbance of sand flow corridors so no more than 1% of the sand flow corridors within a proposed project footprint shall be disturbed for construction.
- Limit disturbance of desert pavement so no more than 5% of the desert pavement within a proposed project footprint shall be disturbed for construction.
- Avoid development in floodplains, unless such development can be mitigated.
- Apply a 0.25-mile protective offset around playas.

Biological and Air Resources CMAs relevant to geology and soils under the Preferred Alternative apply to Alternative 3 as well.

Laws and Regulations

As defined under the No Action Alternative, existing laws and regulations will reduce certain impacts DRECP implementation; they are summarized in Section IV.4.3.1.1. Relevant regulations are described in more detail in Section III.4.1, Regulatory Setting.

IV.4.3.5.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

The conservation designations under Alternative 3 would total 5,023,000 acres (see Chapter IV.1, Table IV.1-1, Summary of Alternative Components). This would result in the protection of soil resources, due to the limitations on development within the DRECP area, and would limit the extent of land on which projects could be developed. This could reduce potential effects of geologic hazards.

IV.4.3.5.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside of the DRECP area on geology and soils would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.4.3.1.3, Impacts of Transmission Outside the DRECP Area.

IV.4.3.5.4 Comparison of Alternative 3 With Preferred Alternative

Table IV.4-9 compares Alternative 3 with the Preferred Alternative for each of the measurable factors included in this analysis.

Table IV.4-9
Comparison of Alternative 3 With the Preferred Alternative

Comparison Factor	Alternative 3	Preferred Alternative
Miles of active fault lines within DFAs	0	10
Miles of active fault lines within 25 miles of DFA boundaries	700	800
Acres of soils with moderate-to-high potential for wind erosion	130,000	210,000
Acres of soils with moderate-to-high potential for water erosion	88,000	107,000
Acres of sand and sand transport corridors in DFAs	32,000	79,000

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

Geographic Distinctions. Many impacts related to geology and soils could occur throughout the DRECP area, so are not useful in distinguishing one alternative from another. In Alternative 3, fewer DFA acres are in the eastern Riverside County region than in the Preferred Alternative, so potential effects to dunes and sand transport corridors in that area would be reduced. Active faults in Alternative 3 are concentrated primarily in DFAs in the Panamint Death Valley, West Mojave and Eastern Slopes, and Imperial Borrego Valley ecoregion subareas.

IV.4.3.6 Alternative 4

Under Alternative 4, activities associated with solar, wind, and geothermal development and operation would be permitted within DFAs. Alternative 4 includes 258,000 acres of total DFAs, approximately 7.6 million acres of existing conservation within the DRECP area, and approximately 4.4 million acres of BLM LUPA conservation designations. In Alternative 4, both dispersed solar and dispersed wind development are anticipated for the Cadiz Valley and Chocolate Mountains ecoregion subarea. Dispersed geothermal development is anticipated in the Imperial Borrego Valley and in the Owens River Valley ecoregion subareas.

Effects of Alternative 4 on geology and soils are described in the following sections. This discussion includes the effects of renewable energy development, including transmission development and other land use decisions within the LUPA Decision Area.

IV.4.3.6.1 Impacts of Renewable Energy and Transmission Development

Under Alternative 4, DFAs are located primarily in the Cadiz Valley and Chocolate Mountains ecoregion subarea and the Imperial Borrego Valley ecoregion subarea portions of the DRECP area. Impacts related to soils, geology, and geologic hazards would occur within the DRECP area from development of solar, wind, and geothermal facilities. Impacts would also occur from transmission development, both within and outside of the DFAs. The potential for soil erosion can be quantified based on acreage of erosive soils that may be disturbed during construction and decommissioning and, to a lesser degree, during site characterization. The potential for impacts from geologic hazards can be quantified based on miles of active fault lines within 25 miles of DFAs in Alternative 4. Other geologic and soil impacts such as disturbance to desert pavement and structural damage from expansive or corrosive soils are assessed qualitatively.

The BLM land use designations (e.g., National Conservation Lands, ACECs, wildlife allocations, and trail management corridors) would prohibit renewable energy development and be managed to protect ecological, historic, cultural, scenic, and scientific resources and values; these designations would also protect geologic and soil resources. Disturbance caps on National Conservation Lands and ACECs would provide further protections. A combination of National Conservation Lands and ACECs would make up the majority of the proposed BLM land designations under Alternative 4.

Existing or expanded SRMAs would also prohibit surface-occupying renewable energy development, but could conversely cause to soil erosion from recreation uses, depending on the extent of allowable uses and management within specific SRMAs.

Impact SG-1: Expose people or structures to injury or damage from seismic, volcanic, or landslide activity.

As described in Volume III, Section III.4.3, the DRECP area is seismically and volcanically active, with major fault lines, young volcanic features, and landslide sediment deposits. Within the DRECP area, major faults include some of the largest in the state, including the San Andreas and San Jacinto faults. During the lifetime of a renewable energy facility, earthquakes within the DRECP area are likely. Table IV.4-10, presents a selection of major active faults, which the USGS defines as having ruptured within the Holocene (the past 11,000 years) (USGS 2014[a]).

For each fault, Table IV.4-10 presents its length within the DFA boundary and its length outside the DFA but within 25 miles of the DFA boundary. In Alternative 4, 2.0 miles of active fault lines are within DFAs and 749.1 miles outside DFAs but within the 25-mile buffer set for this fault analysis. See Volume III, Table III.4-2, Largest Faults Within the DRECP Area, for the earthquake magnitude potential for each of the listed faults and their associated Alquist-Priolo designations. The faults shown in Table IV.4-10 represent a potential geologic hazard that could damage renewable energy facilities. While the majority of these facilities would not include occupied residential structures, damage to property could still be considerable.

Table IV.4-10
Faults Within a 25-Mile Radius of DFAs in Alternative 4

Fault Name	Length of Fault Within DFAs (miles)	Length of Fault Outside DFAs (miles)
Blackwater Fault		13.3
Bullion Fault		15.7
Calico Fault Zone		29.4
Coyote Creek Fault		29.6
Elsinore Fault Zone		16.8
Emerson Fault		23.9
Garlock Fault Zone	1.2	127.4
Gravel Hills - Harper Fault Zone		26.2
Helendale Fault	0.8	29.9
Johnson Valley Fault		35.9
Laguna Salada Fault Zone		19.7
Lenwood Fault		44.2
Lockhart Fault		3.9
Owens Valley Fault Zone		30.0
Panamint Valley Fault Zone		35.0
Pinto Mountain Fault		10.1

Table IV.4-10
Faults Within a 25-Mile Radius of DFAs in Alternative 4

Fault Name	Length of Fault Within DFAs (miles)	Length of Fault Outside DFAs (miles)
San Andreas Fault Zone		129.8
San Bernardino Fault		29.3
San Jacinto Fault Zone		56.5
West Calico Fault		21.0
White Wolf Fault		21.4
Grand Total	**2.0**	**749.1**

Source: USGS 2014b.

Volume III, Section III.4.4.4, describes the locations of recent volcanic activity. Within DFAs in Alternative 4, there is very little area of recent volcanic flow rocks. The likelihood of a renewable energy facility being located near an active volcanic site is low, so facility damage or threat to life is possible but unlikely.

Impact SG-2: Trigger or accelerate soil or sand erosion.

Erosion. Table R2.4-2, Acreage of Erosive Soils Within DFAs for Each Alternative, (Appendix R2) presents erosion potential of soil textures found in the DRECP area and acreage of soil textures with moderate to high potential for erosion found in DFAs in each alternative. Within DFAs in Alternative 4, there are approximately 102,000 acres of soils with a moderate to high potential for wind erosion and approximately 51,000 acres of soils with a moderate to high potential for water erosion. Development of renewable energy facilities within these areas of DFAs in Alternative 4 would increase the likelihood of soil erosion from wind and water.

Sand Transport. Under Alternative 4, DFAs in the East Riverside region are either on or near an important sand transport corridor in the Chuckwalla Valley. The corridor runs parallel to I-10 in Riverside County between Desert Center and Blythe. Other sand transport corridors include the Mojave River corridor (including the Kelso Dunes), the Bristol Trough corridor (including the Cadiz and Danby dunes), the Rice Valley corridor (including the Rice Valley Dunes), and the Clark's Pass corridor (including the Dale Lake Dunes and Palen-Ford Dunes) (USGS 2003). Renewable energy facilities in these DFAs could impede sand transport and affect valuable habitat within this corridor of active sand dunes. Within DFAs in Alternative 4, there are 65,000 acres of dune systems and sand transport corridors.

Impact SG-3: Expose structures to damage from corrosive or expansive soils.

As stated in Section IV.4.2, Typical Impacts Common to All Alternatives, corrosive soils could damage foundations and structural elements of renewable energy facilities. Expansive soils could cause soils to shrink or swell, also damaging foundations and other structural elements. Alternative 4 includes approximately 3,000 acres of potentially expansive soils. See Table R2.4-3, Acreage of Expansive Soil Textures Within DFAs for Each Alternative (Appendix R2). Expansive soil textures include clay, clay loam, silty clay, and silty clay loam. Playas, North American warm desert alkaline scrub, herb playa, and wet flat all indicate potentially corrosive soil. Alternative 4 includes 10,000 acres of potentially corrosive soils within DFAs.

Impact SG-4: Destroy or disturb desert pavement.

Renewable energy facilities constructed in DFAs in Alternative 4 may damage desert pavement. Excavation and grading during construction and decommissioning, as well as ground disturbance from workers, vehicles, and equipment, would damage or disturb this important habitat. Specific locations of desert pavement that have not been mapped would require field surveys.

Impacts on Variance Process Lands

Variance Process Lands are neither reserve lands nor DFAs. They are a subset of the variance lands identified in the Solar PEIS Record of Decision and additional lands that, based on current information, have moderate to low ecological value and ambiguous value for renewable energy. If renewable energy development occurs on Variance Process Lands, LUPA would not be required, so the environmental review process would be simpler than if the location were left as undesignated.

Variance Process Lands for each alternative are as shown in Chapter IV.1, Table IV.1-2, and in Volume II, Chapter II.7, Figure II.7-1 for Alternative 4. Development of Variance Process Lands would have similar air quality effects as described under Impacts SG-1 through SG-4.

Impact Reduction Strategies

Implementation of the Proposed LUPA would create both additional conservation designations for some desert lands and designate other areas for streamlined renewable energy development. The impacts of renewable energy development within DFAs would be lessened in several ways. First, it incorporates CMAs for each alternative, including LUPA-wide CMAs and CMAs for specific land designations, such as NLCS lands, ACECs, and wildlife allocations. Implementation of existing laws, orders, regulations, and standards would also reduce the impacts of project development.

Conservation and Management Actions

The conservation strategy for Alternative 4 (presented in Volume II, Section II.7.4) defines specific actions that would reduce the impacts of this alternative. Section II.7.4.2 presents specific CMAs for Alternative 4. The CMAs in Alternative 4 that are relevant to geology and soils would be the same as the CMAs for the Preferred Alternative that are shown in Section IV.4.3.2.1, except as described below.

All of the CMAs described for the Preferred Alternative would apply to Alternative 4, with the following modifications for activities within DFAs:

- Limit disturbance of sensitive soil areas, so no more than 20% of the sensitive soil areas within a proposed project footprint would be disturbed by construction.
- Limit disturbance of sand dunes, so no more than 5% of the sand dunes within a proposed project footprint would be disturbed by construction.
- Limit disturbance of sand flow corridors, so no more than 5% of the sand flow corridors within a proposed project footprint would be disturbed by construction.
- Limit disturbance of desert pavement, so no more than 5% of the desert pavement within a proposed project footprint would be disturbed by construction.
- Avoid development in floodplains unless it can be mitigated.
    - **Exceptions:** Exceptions to any of these stipulations may be granted by the authorized officer if the operator submits a plan that demonstrates that:
        - The impacts from the proposed action are temporary.
        - The impacts are minimal or can be adequately mitigated.
        - Critical resources, including threatened and endangered species, are fully protected.
    - **Modifications:** No modifications will be granted.
    - **Waivers:** No waivers will be granted.

Biological and Air Resources CMAs relevant to geology and soils under the Preferred Alternative apply to Alternative 4 as well.

Laws and Regulations

As defined under the No Action Alternative, existing laws and regulations will reduce certain impacts of LUPA implementation; they are summarized in Section IV.4.3.1.1. Relevant regulations are described in more detail in Volume III, Section III.4.1, Regulatory Setting.

IV.4.3.6.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

The conservation designations under Alternative 4 would total 4,431,000 acres (see Chapter IV.1, Table IV.1-1, Summary of Alternative Components). This would result in the protection of soil resources by limiting development within the DRECP area and the available land on which projects could be developed. This could reduce potential geologic hazards.

IV.4.3.6.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside of the DRECP area on geology and soils would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.4.3.1.3, Impacts of Transmission Outside the DRECP Area.

IV.4.3.6.4 Comparison of Alternative 4 With Preferred Alternative

Table IV.4-11 compares Alternative 4 with the Preferred Alternative for each of the measurable factors included in this analysis.

Table IV.4-11
Comparison of Alternative 4 With the Preferred Alternative

Comparison Factor	Alternative 4	Preferred Alternative
Miles of active fault lines within DFAs	2.0	7.6
Miles of active fault lines within 25 miles of DFA boundaries	749.1	766.4
Acres of soils with moderate-to-high potential for wind erosion	102,000	210,000
Acres of soils with moderate-to-high potential for water erosion	51,000	107,000
Acres of sand and sand transport corridors in DFAs	65,000	79,000

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals ; therefore, the subtotals may not sum to the total within the table.

Geographic Distinctions. Many impacts related to geology and soils could occur throughout the DRECP area, so are not useful in distinguishing one alternative from another. In Alternative 4, the DFA in the eastern Riverside County region is similar to that of the Preferred Alternative. These significant dune and sand transport corridors that would be affected by development are located along I-10. In this alternative, active faults are concentrated in DFAs in the Panamint Death Valley and West Mojave and Eastern Slopes ecoregion subareas.

IV.5 FLOOD HAZARD, HYDROLOGY, AND DRAINAGE

IV.5.1 Approach to Impact Analysis

This chapter analyzes potential impacts to surface water resources. Chapter III.5, Flood Hazard, Hydrology and Drainage, describes existing conditions for surface water. This analysis of impacts for each alternative within the Desert Renewable Energy Conservation Plan (DRECP) Land Use Plan Amendment (LUPA) decision area examines likely activities and their impacts to surface water on Bureau of Land Management (BLM)-managed lands as well as the overall conservation strategy within the LUPA Decision Area. Transmission facilities may also be developed outside Development Focus Areas (DFAs), but would fall under the Proposed LUPA's permitting and management conditions.

Construction and operation of renewable energy projects could worsen flooding and disrupt natural stream processes, increase erosion and downstream soil transport, and degrade or contaminate soil and water. Extensive existing regulatory programs currently prevent or minimize these adverse environmental impacts. The focus of this programmatic analysis instead identifies a range of potential effects on flooding, hydrology, and drainage and applies those programs and Conservation and Management Actions (CMAs) to avoid, minimize, or mitigate adverse effects to the environment.

IV.5.1.1 Assumptions

Assumptions used in this analysis flood, hydrology and drainage impacts include the following:

- Renewable energy development within the DRECP area would neither require nor cause any new appropriations or diversions of surface waters to meet water supply needs during the construction, operation, maintenance, or decommissioning of renewable projects. Water would come primarily from existing groundwater supplies from local water purveyors. For more information on groundwater, see Chapter IV.6, Groundwater, Water Supply, and Water Quality.
- This analysis does not evaluate impacts to designated wild and scenic rivers since they are already protected under the federal Wild and Scenic River Act. Only 26.3 miles of the Amargosa River have this designation within the LUPA decision area. The BLM is currently preparing a Stream Management Plan for this section of the Amargosa River, which will further define allowable activities within its vicinity and provide clear setback requirements for possible nearby development. Included in this analysis are CMAs developed by BLM to avoid or minimize adverse environmental impacts, including the requirement that renewable energy projects would either avoid or be set back from wild and scenic river boundaries within the DRECP area.

- Potential adverse impacts to springs and seeps are similarly not evaluated because they are already protected under CMAs; because of their limited areal footprint they can also be easily identified and avoided in development areas. Springs depend largely upon groundwater; for more information on their relationship to groundwater see Chapter IV.6, Groundwater, Water Supply, and Water Quality.
- Potential violations of water quality standards or waste discharge requirements, or surface water quality degradation, are not quantifiable under the programmatic DRECP. Water quality standards compliance is federally mandated (Clean Water Act [CWA] Sections 303, 401, 402, and 404) (Resource Conservation and Recovery Act), state mandated (Porter-Cologne Water Quality Control Act, California Fish and Game Commission [CFGC] Sections 1600-1616, as amended, Sections 5650-5656), and additionally mandated by local standards and regulations. Evaluation of water quality standards compliance will be conducted on a project-specific basis and consider both project design and local conditions (see Chapter IV.6, Groundwater, Water Supply, and Water Quality). Determining surface water resource values considered their biological resource benefits, which were identified throughout development of the DRECP plan alternatives. The alternatives also identify where projects and conservation areas could be located within the LUPA decision area to avoid or minimize adverse environmental impacts to the highest-value resources, including surface water. This section quantifies potential effects to surface water for the No Action Alternative and scenarios developed through the DRECP alternatives, which by design seek to avoid or minimize adverse effects to valuable surface water resources.

Chapter IV.6, Groundwater, Water Supply, and Water Quality, further addresses water issues though its focus is groundwater.

IV.5.1.2 Methods for Quantifying Potential Effects

In this section, potential effects to each ecoregion subarea, in each alternative, are evaluated with two primary objectives in mind: to reduce flooding, to reduce water quality degradation, and reduce impacts to hydrologic surface water features; additional objectives would maintain natural surface water, groundwater, and hydrogeomorphic processes, and hydrologic regimes. Environmental impacts from full development of DFAs were quantified by measuring the following:

- **Potential to experience flood hazard.** This potential is evaluated with Federal Emergency Management Agency (FEMA) floodplain maps that show populated regions for floods with the statistical 1% chance of occurring every year (i.e., 100-year flood events). Because of its sparse population FEMA has not evaluated much

of the DRECP area for potential flood hazards, so its evaluation of much of the DRECP area is inconclusive. Based on current data, flood potential hazard within each ecoregion subarea's acreage has been classified as 0.2%, 1%, minimal chance of annual occurrence, or could not be assessed. This analysis focuses on impact potential within the mapped 100-year floodplain.

- **Potential effects to surface water linear features and their contributing drainage networks.** The method used to quantify effects in the DRECP area included quantifying the lengths, in miles, of ephemeral streams and rivers, perennial and intermittent streams and rivers, and canals and ditches. When considering these potential effects it is best to also consider each feature's streambeds and channel banks and how they relate to each other and cumulatively within each ecoregion subarea. Because that data was not available, linear surface water features were quantified using only stream lengths. This method can potentially underestimate environmental effects since available data is limited to the centerline rather than the full areal extent of these features, which would include their lateral elements. In any event, a more detailed quantification of potential effects will be required in project-specific environmental assessments. Linear water resources data evaluated in this Environmental Impact Statement (EIS) come from the National Hydrography Dataset (NHD), which was developed by the U.S. Geological Survey (USGS). The NHD is a feature-based database that interconnects and uniquely identifies stream segments and reaches that make up the nation's surface water drainage system. NHD linear water resource data includes ephemeral streams and rivers, perennial and intermittent streams and rivers, and canals and ditches (USGS 2010). Additional linear water resources may exist on individual project sites. While imperfect, this method does provide relative measures to identify and assess effects to linear surface water features in the ecoregion subareas.
- **Potential effects to surface water bodies.** These effects are evaluated using acres of water in water bodies that include ephemeral lakes and playas, perennial lakes and reservoirs, wetlands (as identified in the National Wetlands Inventory [NWI] and compiled by the U.S. Fish and Wildlife Service [USFWS]), and swamps and marshes. Areal water resource data evaluated in this EIS is from NWI data developed by USFWS (USFWS 2014). This data illustrates the extent and approximate locations and types of wetlands and deepwater habitats in the conterminous United States; it also delineates the areal extent of wetlands and surface waters (Cowardin et al. 1979). Some wetland habitats do not appear in the NWI mapping program because of aerial detection limitations. The USFWS also excludes some types of "farmed wetlands" that are either defined by the Food Security Act or that do not conform to the accepted definition (Cowardin et al. 1979).

Flooding could cause erosion; the erosion potential of both wind and water is evaluated in Chapter IV.4, Geology and Soils. Chapter IV.6, Groundwater, Water Supply, and Water Quality, also addresses water issues though it focuses on groundwater.

IV.5.2 Typical Impacts Common to All Action Alternatives

The following discussion of typical impacts common to all action alternatives refers to the renewable energy and ancillary facilities described in Volume II, Chapter II.3. It describes activities during pre-construction site characterization, construction, operations and maintenance, and decommissioning.

IV.5.2.1 Impacts of Renewable Energy and Transmission Development

Flooding, conditions that could worse flooding, and impacts to other hydrologic surface water features and drainage patterns generally depend upon how widespread the land disturbance may be from renewable energy and transmission projects. The broader and more intensive the land disturbance, the greater the likelihood it could affect surface water. (See Figure III.5-1, Linear and Areal Surface Water Resources and Watersheds in the DRECP area.) Distinctions in these levels of disturbance and their potential impacts on the types of renewable energy and transmission development are discussed here.

In general, transmission development may have the least impact because its footprint—switchyard, substation, and tower and pole locations —are usually more site-selective because they require less area and can therefore avoid most surface water features. Footings for transmission and gen-ties, towers, or poles do not significantly alter existing ground conditions for drainage. New access roads would cause more widespread ground disturbance, but likely not over surface water features.

Wind energy is most like transmission because the turbine pads are small and their locations would avoid many surface water resources. Wind turbines located within a floodplain would cause minimal adverse effects if turbine pads are small and spacing allows flood flows to pass by largely unimpeded.

Geothermal development also generally causes less ground disturbance when compared with other types of projects because its power plant, switchyard, and associated steam wells and pipelines require much less area. Similar to transmission, geothermal development can be site-selective and avoid sites near surface water resources.

Solar energy development including thermal trough, thermal power tower, and photovoltaic (PV), creates the greatest land disturbance because it requires significantly more area (typically one or more square miles compared with fewer than 100 acres for most geothermal). The extent of ground disturbance varies; required thermal trough and

PV site grading removes all vegetation, disturbs biological soil crust, and causes the greatest disturbance to surface water and drainage patterns. Disturbance to vegetation and surface soils changes infiltration and runoff, which in turn leads to greater potential for erosion, sedimentation, flooding, and water quality degradation. Thermal power tower has fewer land disturbing impacts when compared with thermal trough and PV by largely maintaining existing ground contours within the mirror field and cutting vegetation near ground level instead of entirely removing it (thereby maintaining existing surface soil characteristics). However, many varieties of vegetation will not survive or remain as vigorous as they were before the ground disturbance; and although surface soils are not removed by grading, their infiltration and runoff characteristics can be significantly altered. While not all solar technologies and projects will require the same acreage per megawatt (MW) of installed capacity, DRECP assumes 7 acres per MW for all solar technologies.

IV.5.2.1.1 Impacts of Site Characterization

Site characterization activities that could affect surface water include off-road travel and geologic borings. Soil and vegetation disturbance from off-road travel can compact soil, disturb biological soil crusts, and damage vegetation, consequently changing water infiltration and runoff characteristics. Greater runoff could in turn change natural ground conditions and cause erosion. Off-road travel can also cross ephemeral streams, which could in turn impact the stream's bed and bank structure and alter its course or change its flow rates and frequencies. These stream impacts could then affect morphological and ecological processes to both vegetation and animal species. Drilling geologic borings can cause similar impacts from travel to and from boring sites; equipment could also cause soil and water contamination if hydraulic drilling equipment leaks, or if drilling fluids are not properly contained and treated.

IV.5.2.1.2 Impacts of Construction and Decommissioning

IV.5.2.1.2.1 Flood Hazards and Effects on Streams and Rivers

Land disturbance activities described in Covered Activities in Volume II, including clearing, grading, excavating, road construction, vegetation removal, fencing, drainage, and building flood control structures could all potentially disrupt drainage patterns, particularly to ephemeral stream channels. Considering the large areas required for most renewable energy projects, it is likely that ephemeral and intermittent streams will flow through proposed project areas and that their drainage paths and patterns will be altered. Project facilities, roads, temporary laydown areas, and their surrounding environments can all be subject to flooding during project construction and decommissioning. Flooding may cause environmental damage beyond facility sites and include erosion, sedimentation, and soil and water contamination from hazardous materials transport. Stream disturbance can also

alter and diminish riparian habitat and the wildlife that depends upon it, as described in Chapter IV.7, Biological Resources.

Disturbance to episodic streams could disrupt numerous ecological functions including (1) watershed and landscape hydrologic connections; (2) water supply protection and water-quality filtering; (3) wildlife habitat movement and migration corridors; (4) sediment transport, storage, and deposition; (5) groundwater recharge and discharge; (6) vegetation community support; and (7) nutrient cycling and movement. These streams also form critical interactions with adjacent drier upland areas to support critical species life stages and contribute to overall regional biodiversity. These systems provide primary habitat, predator protection, movement corridors, migration stop-over sites, breeding and nesting sites, shade, and food sources and water in temporary or permanent pools for many species (Southern California Coastal Water Research Project [SCCWRP] 2011).

Ground disturbances within drainage areas can cause one or more of the following long-term effects:

- Alter existing drainage patterns through grading or channelization that could cause concentrated stormwater flow patterns that could in turn increase erosion, sediment transport, and flooding when compared with natural diffused or distributary stormwater flow patterns.
- Substantially increase the rate or amount of surface runoff through ground disturbances (e.g., paving) that make the ground less pervious, which could then cause flooding, substantial erosion, and sediment transport, both on and off site.
- Alter the course of a stream or river or change its flow rates and frequencies, causing changes to morphological and ecological processes that affect vegetation and animal species as subsurface water availability changes.
- Diminish the surface crusts found on relatively undisturbed soil surface areas of playas, increasing their vulnerability to wind erosion.
- Create or contribute to runoff that would either exceed the capacity of drainage systems or increase sources of polluted runoff.
- Place structures within a flood hazard area that would impede or redirect flood flows, causing debris scatter or conveyance of hazardous materials or wastes.

IV.5.2.1.2.2 Effects on Springs

Springs sustain habitat and wildlife; considering the lack of continuously flowing surface water in the DRECP area, springs provide important environmental value, though it's typically limited to their immediate locations. Disturbing springs would cause long-term adverse impacts to discharge, distribution, and the other ecological values springs provide.

If a spring is disturbed or enclosed within the fenced area of a renewable energy or transmission facility, wildlife would not be able to reach it.

IV.5.2.1.2.3 Effects on the Water Quality and Beneficial Uses of DRECP Area Waters

Construction and decommissioning project phases would most likely affect the water quality and beneficial uses of DRECP area waters. During construction, hazardous materials, particularly oil-based and liquid chemical products, can spill and cause contamination to soils, surface water bodies, and groundwater. Groundwater encountered during excavation can become turbid and degrade surface water quality if not properly managed. Water used for hydrostatic testing and flushing pipelines can contain metals and other hazardous substances, so can affect surface and groundwater quality if not properly treated before discharge. Storage of hazardous materials and wastes during construction and decommissioning can be disturbed by stormwater and flooding if not properly contained, or if project-related stormwater drainage facilities are not properly designed. These project-related activities can cause degradation and long-term adverse effects to water quality.

Beneficial water uses within the DRECP area include:

- Rare, Threatened or Endangered Species – Beneficial waters that support habitat necessary for the survival and successful maintenance of plant and animal species designated under federal or state law as rare, threatened or endangered.
- Warm Freshwater Habitat – Beneficial water uses that support warm water ecosystems including, but not limited to, preservation and enhancement of aquatic habitats, vegetation, fish, and wildlife, including invertebrates.

Strategies including avoidance, minimization, and mitigation measures could all be used when evaluating specific projects to avoid or minimize potential adverse impacts to the beneficial uses of water. Unavoidable impacts requiring mitigation are as listed in the Conservation and Management Actions section of this chapter. Water Quality is also evaluated in Chapter IV.6 Groundwater, Water Supply and Water Quality.

IV.5.2.1.3 Impacts of Operations and Maintenance

Project facilities, roads, and their surrounding environments can be flooded during operations and maintenance. Considering the large area of most renewable energy projects, it is likely that ephemeral streams will flow through proposed project areas, and that drainage paths and processes will be altered. This can cause developed drainage systems to exceed their design capacities, which in turn could damage both the project and the environment, both on and off site (e.g., erosion, sedimentation, and contamination of

soil and water by transport of project-related hazardous materials and wastes). Disturbance to streams can also alter and diminish riparian habitat (see Chapter IV.07, Biological Resources). If a spring is enclosed within a project's fenced area, wildlife would not be able to reach it.

Hazardous material and waste storage during operations and maintenance can be disturbed by stormwater and flooding if not properly contained, or if stormwater drainage facilities are not properly designed. Heat transfer fluids from some solar thermal-electric generation technologies (e.g., parabolic trough) can also potentially contaminate soils, surface water, and groundwater if there is a rupture in heat transfer piping systems. These project-related activities can cause degradation and long-term adverse effects to water quality and the beneficial uses of surface waters and groundwater.

IV.5.2.2 Impacts of the Ecological and Cultural Conservation and Recreation Designations

In order to meet purpose and need for the Proposed LUPA (defined in Volume I), ecological and cultural conservation designations were developed for each alternative. Conservation designations include existing conservation (Legislatively and Legally Protected Areas [LLPAs]) and LUPA Conservation Designations. Setting aside lands where disturbance would be minimized is a beneficial effect for surface water resources because of the reduced ground disturbance and resulting runoff in the vicinity of linear and areal surface water resources. Exacerbation of flood effects and degradation of water quality would not occur because there would not be any alteration to the drainage area and natural hydrologic processes within the 100-year floodplain. To the extent projects could be avoided within drainage areas, it would minimize the potential for contamination to soil and water from project-related hazardous materials and wastes.

For surface water resources, CMAs and conservation designation are different for each alternative but also have similarities. For each alternative, there are the following differences: (1) the areal density of surface water features (including wetlands, the bed and banks of streams, and lakebeds of reservoirs and playas versus the overall area of land); (2) the location and areal extent of lands selected for DFAs versus location of surface water resources; and (3) the location and areal extent of conservation lands versus locations of surface water resources. These distinctions are considered in more detail in Section IV.5.3, Impact Analysis by Alternative.

Because LUPA land designations would be managed to protect ecological, historic, cultural, scenic scientific, and recreation resources and values, they would also confer general protection for surface water resources. While other land uses are allowed within these

areas, other uses must be compatible with the resources and values that the land designation is intended to protect.

Setting aside lands for no disturbance is a beneficial effect for surface water resources because road crossings and ground disturbance would be avoided in the vicinity of linear and areal surface water resources. Exacerbation of flood effects and degradation of water quality would not occur because there would not be any alteration to the drainage area and natural hydrologic processes within the 100-year floodplain. To the extent developments are avoided within drainage areas, they would also minimize the potential for soil and water contamination from project-related hazardous materials and wastes.

Details on allowable uses and management within National Conservation Lands appear in the Proposed LUPA description in Volume II. Details on the goals, objectives, allowable uses, and management actions for each Area of Critical Environmental Concern (ACEC) and Special Recreation Management Area (SRMA) are in the LUPA worksheets in Appendix H.

IV.5.3 Impact Analysis by Alternative

The following sections present impact analyses for the No Action Alternative, the Preferred Alternative, and Alternatives 1 through 4. The process for determining which surface water resources have the highest values primarily considers their biological resource benefits, which were identified through the process of developing alternatives. The alternatives determine where development and additional conservation areas would be located to avoid or minimize effects to the highest value resources, including surface water. This section focuses on quantifying potential effects to surface water resources for the No Action Alternative and the scenarios developed through the defined alternatives, which by design seek to avoid and minimize effects to valuable surface water resources.

IV.5.3.1 No Action Alternative

In the No Action Alternative, no DFAs would be created. Instead, the existing geographic distribution of existing renewable energy development is assumed to continue. Conservation lands would remain as currently designated.

Figure IV.5-1 shows the expected geographic distribution of renewable energy development in the DRECP area and where conservation areas exist in relation to surface water resources for the No Action Alternative. Major surface water resources that could be developed under the No Action Alternative include the Amargosa, Mojave, and Colorado rivers.

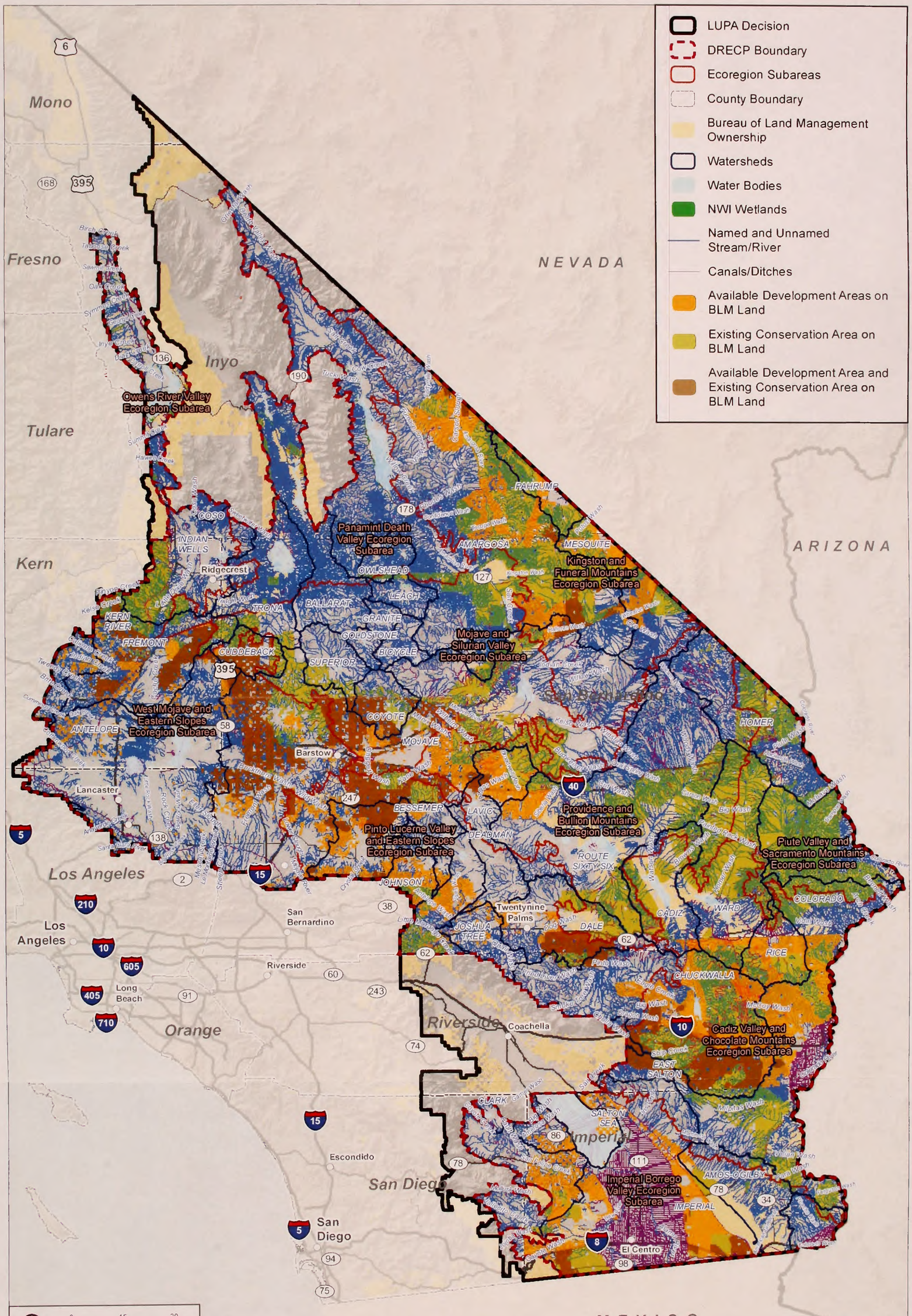
Climate Change and Surface Water Effects. Climate change in the DRECP area was evaluated by the Conservation Biology Institute (CBI) and is presented in the report Climate Change (Bachelet 2013) and in Appendix P. The CBI report provides background

information for climate change and describes long-term adaptive management strategies. The CBI report provides information regarding:

- The existing climate setting for the Mojave and Sonoran deserts.
- The development of climate models, including uncertainty and scale issues.
- Projections for climate change in the DRECP area, including temperature and precipitation patterns and their effects on snowpack, hydrology, vegetation, and fuels and fire risk.

The CBI report summarizes several of the projected large-scale environmental effects of climate change that will likely affect natural resources in the DRECP area, including changes in snowpack, hydrology, vegetation, and fuels and fire. Snowpack is projected to decrease under both the drier and wetter scenarios of the Parallel Climate Model (PCM) and Geophysical Fluid Dynamics Laboratory (GFDL) scenarios, although the PCM projects slightly higher snowpacks at higher elevations of the Sierra Nevada through the twenty-first century (see Figure 14 in Appendix P).

Snowpack levels and the timing of precipitation and groundwater levels will all alter major river flows, with a modest decrease in Colorado River flows and alterations in the hydrology of the Amargosa and Mojave rivers (although the CBI report does not elaborate on the specific types of those alterations). The Mojave River receives runoff from the San Bernardino Mountains, and the Amargosa River is bordered by several high mountain ranges that accumulate winter snowpack (see Figure 14 in Appendix P). Under both the PCM and GFDL models there will be substantial reductions in snowpack in both the San Bernardino and San Gabriel mountain ranges by 2100, as well as in the mountain ranges bordering the Amargosa River.



Sources: ESRI (2014); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); USGS (2011); RECON (2015)

FIGURE IV.5-1

Linear and Areal Surface Water Resources and Watersheds in the DRECP Plan Area - No Action Alternative

DRECP Proposed LUPA and Final EIS

October 2015

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The Amargosa River region is sparsely populated and land uses along the river include rural communities, mining, and agriculture. The Amargosa River currently has surface flows, which extend about 17 miles along the river in the Shoshone, Tecopa, and Amargosa Valley areas and support well-developed cottonwood-willow riparian habitat that provides valuable wildlife habitat for a variety of species.

The Mojave River runs approximately 100 miles from the northern slope of the San Bernardino Mountains at Summit Valley near Cajon Pass, north through Victorville, to the northeast through Barstow, and then east through the Mojave Valley and Camp Cady to a closed basin sink near Baker. The Mojave River surface water flows are mostly ephemeral and occur during the winter and spring as a result of storm runoff. Recharge of the water basin along the Mojave River is primarily (up to 80%) from stormflow infiltration from the mountains in January through March, but the water table is being overdrafted by urban use, which is affecting the hydrology of the system and riparian communities along the river. With a reduction in the snowpack and increased human demands, it is expected that the Mojave River will be stressed by future climate change.

Hydrologic effects under drier climate conditions also include reduced soil moisture and less groundwater recharge. Both the PCM and GFDL models project climate water deficits, which is the difference between actual evapotranspiration (AET) and potential evapotranspiration (PET), or PET-AET, or where evaporative demand is greater than available water (see Figure 6 in Appendix P). The CBI report suggests that, with these changes, riparian corridors will become "islands of refuge" for species at risk from extreme heat and evaporative demand.

IV.5.3.1.1 Impacts of Renewable Energy and Transmission Development

For the No Action Alternative, the locations for development may not avoid disturbance to the most sensitive surface water resources with the highest values for hydrologic function including maintaining natural surface water processes, groundwater processes, hydrogeomorphic processes, and hydrologic regimes. The impacts that have been defined are the types identified by, and based on the experience of, the lead agencies for approved solar, wind, and geothermal renewable energy and transmission projects.

The No Action Alternative would allow renewable energy and transmission development anywhere within existing unrestricted lands in the DRECP area. The following impacts from ground disturbance and development within drainage areas can cause one or more of the following long-term effects common to the No Action Alternative and all other alternatives.

Impact FH-1: Activities could substantially alter existing drainage patterns and increase the risk of flooding on or off site.

The extent to which drainage patterns can be altered and the risk of flooding on or off site increased is a combination of one or more of the following effects from development within a floodplain. Those effects could:

- Alter the existing drainage pattern of the site or area through grading or channelization, resulting in concentrated stormwater flow patterns that increase the potential for erosion, sediment transport, and flooding compared with natural diffused or distributary stormwater flow patterns.
- Substantially increase the rate or amount of surface runoff by ground disturbance and treatments that make the ground less pervious (e.g., paving) in a manner that could cause flooding or substantial erosion and sediment transport on or off site.
- Diminish the physical and biological crusts on relatively undisturbed soil surface areas of playas, increasing their vulnerability to erosion.
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or contribute to substantial additional sources of polluted runoff.

Any ground disturbance in the vicinity of a surface water feature, particularly those associated with construction and decommissioning, can lead to long-term adverse impacts to surface water resources. Significant land disturbance can occur during the construction and removal of facilities. As discussed in Section IV.5.2, Typical Impacts Common to All Action Alternatives, development with the greatest to the least typical land disturbance is: solar, geothermal, wind energy, and transmission.

As summarized in Table IV.5-1 (see Appendix R2, Table R2.5-1 for complete data), development within the No Action Alternative could occupy about 1,344 acres of lands within the mapped 100-year floodplain on BLM lands in the DRECP area. This represents about 1% of the total mapped 100-year floodplain area on BLM lands in the DRECP area. Solar energy represents about 80% of this small percentage of potential development, mostly in the Cadiz Valley and Chocolate Mountains and Imperial Borrego Valley ecoregion subareas. This would suggest that development within the 100-year floodplain on BLM lands in the DRECP area would not impact 99% of the 100-year floodplain. However, it is important to recognize that overall, 72% of the DRECP area has not been assessed for flood potential, suggesting that development within the DRECP area's 100-year floodplain could occupy more than 1% of the total area.

The No Action Alternative would not have protections under CMAs that apply to the action alternatives, so therefore does not require that areas not previously assessed by FEMA undergo hydrologic study to determine the 100-year floodplain in proximity to the project.

Table IV.5-1
Potential Development Within Mapped 100 Year Floodplains on BLM Lands in the DRECP Area (acres) – No Action Alternative

	Wind	Geothermal	Transmission	Solar	Total
Potential Development Within 100-year Floodplains on BLM Lands in the DRECP area	74	22	121	1,126	1,344
Total 100-year Floodplains on BLM Lands in the DRECP area	132,595	132,595	132,595	132,595	132,595
Percent of 100-year Floodplains that Could be Developed on BLM Lands in the DRECP area	0.1%	0%	0.1%	0.8%	1.0%

Note: Full data tables are available in Appendix R2.
The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

Impact FH-2: Activities could alter hydrologic processes and water-dependent resources of surface water features.

Land disturbance activities during project development, including clearing, grading, excavation, road construction, vegetation removal, fencing, drainage and flood control structures, have the potential to disrupt drainage patterns, particularly of ephemeral stream channels. Considering the large area of most renewable energy developments, it is likely that ephemeral and intermittent streams will flow through proposed project areas, and that their drainage paths and patterns will be altered. Land disturbance can also alter the course of a stream or river, or change its flow rates and frequencies, causing variations to morphological and ecological processes that affect vegetation and animal species.

While Table R2.5-2 and Table R2.5-3 (in Appendix R2) suggest that the potential development impacts to linear and areal surface water resources on BLM lands in the DRECP area would be minimal on an overall basis (representing potential impacts to 0.8% of linear and 0.2% of areal surface water resources), it is important to recognize data limitations. Impacts to linear surface water features can potentially be underestimated since the available data is limited to consideration of only centerline lengths rather than the areal extent of these features, as defined by their streambeds and channel banks.

Impact FH-3: Activities could result in accidental releases of contaminants resulting in degradation of water quality.

During all project phases, hazardous materials used and hazardous wastes generated, particularly oil-based and liquid chemical products, if not properly handled and contained, can spill and cause contamination to soils, surface water bodies, and groundwater. Stored hazardous materials and wastes can be disturbed via stormwater and flooding if not properly established within containment areas, and can cause degradation and long-term adverse effects to both water quality and the beneficial uses of surface waters and groundwater.

Although there are no quantifiable metrics for Impact FH-3, there are distinctions in the levels of potential exposure for contaminants to enter surface waters by technology. Thermal trough technology, for example, which uses a heat transfer fluid conveyed throughout the solar field, likely has the highest exposure for spills and contamination. Although this technology uses a variety of safeguards to monitor and detect a release and limit a release should a line rupture, it is not fail safe. Thermal power tower and geothermal energy would normally limit exposure to storage of hazardous materials and wastes around the power block, which has containment systems. PV solar, wind energy, and transmission have the least exposure because there is no need for large quantities of hazardous materials to be used and stored on site (other than oil-filled electric switchgear and transformers common to all renewable energy and transmission projects). The handling, transportation, storage, and disposal of hazardous materials and wastes are regulated by a wide range of laws and regulations that would avoid or limit exposure to accidental spills and releases.

Laws and Regulations

Existing laws and regulations would reduce the impacts of renewable energy development projects in the absence of the DRECP. Relevant regulations are presented in the Regulatory Setting in Volume III. Note that because this EIS addresses amendments to BLM's Proposed LUPA, these plans are addressed separately and are not included in this section. The requirements of relevant regulations would reduce impacts through the following mechanisms:

- The Clean Water Act (CWA) establishes water quality standards, discharge prohibitions, and waste discharge limits that would help prevent degradation of surface and groundwater quality from discharges to surface waters and wetlands, point source discharges (including stormwater), and dredge and fill activities in surface waters and wetlands.
- The Resource Conservation and Recovery Act (RCRA) would help protect surface water resources from contamination by regulating the generation, transportation,

treatment, storage, and disposal of hazardous waste. RCRA is administered in California by the Department of Toxic Substances Control and California's Regional Water Quality Control Boards (RWQCBs).

- Federal Executive Order 11990 – Protection of Wetlands (applicable to federal lands) and State Executive Order W-59-93 would require projects to avoid or minimize impacts to wetlands.
- Executive Order 11988 – Floodplain Management would require developments on federal land to avoid or minimize effects within the mapped 100-year floodplain.
- The Porter–Cologne Water Quality Control Act would protect the water quality and beneficial uses of waters of the state (both surface and groundwater) under the authority of the State Water Resources Control Board (SWRCB or State Water Board) and nine RWQCBs to establish water quality standards and discharge prohibitions, issue waste discharge requirements, and implement provisions of the federal CWA.
- California Fish and Game Code, Sections 1600-1616, as amended, would help avoid or minimize effects to surface water resources from projects that could substantially divert or obstruct natural flows or change or use any material from the bed, channel, or bank of any river, stream, or lake; or deposit or dispose of debris where it may pass into any river, stream, or lake, or use materials from a streambed.
- California Fish and Game Code, Sections 5650-5656, as amended, prohibits the deposit of any substance or material deleterious to fish, plant life, mammals, or birds. County General Plans and Development Codes present standards for grading and erosion control, managing stormwater, disposing of liquid waste and extracting groundwater. If a proposed site is on federal land where county regulations are not directly applicable to the project, the federal land manager has the option to confer with the county to determine and implement specific county General Plans and Development Codes as appropriate.

Design Features of the Solar PEIS

The Solar Programmatic EIS (PEIS) includes numerous Design Features (Appendix W) that would reduce the impacts of solar energy development, including measures to minimize erosion and runoff. Following is a summary of relevant measures.

- **WR1-1.** The project developer shall control project site drainage, erosion, and sedimentation related to stormwater runoff. The project developer shall identify site surface water runoff patterns and develop measures that prevent adverse impacts associated with project-related soil deposition and erosion throughout and downslope of the project site and project-related construction areas. This shall be

implemented within a Stormwater Pollution Prevention Plan and incorporated into the POD, as appropriate. Numerous specifics are presented to ensure that effects are minimized, focusing on (a) Assessing stormwater runoff concerns, and (b) Methods to minimize stormwater runoff concerns.

- **WR1-2.** Project developers shall conduct a hydrologic study (or studies) that demonstrate a clear understanding of the local surface water and groundwater hydrology. Specifics require assessment of surface water and groundwater hydrology.
- **WR1-3.** Project developers shall coordinate with BLM and other Federal, state, and local agencies early in the planning process in order to identify water use for the solar energy project, and to secure a reliable and legally available water supply to meet project water needs. Specific requirements include (a) Assessing water use, and (b) Methods for minimizing water use.
- **WR1-4.** Project developers shall avoid and/or minimize impacts on existing surface water features, including streams, lakes, wetlands, floodplains, intermittent or ephemeral streams, and playas (any unavoidable impacts would be minimized or mitigated) and in nearby regions resulting from the development.
- **WR2-1.** Project developers shall avoid, minimize, and mitigate impacts on groundwater and surface water resources in accordance with laws and policies. Specific methods are defined to minimize impacts on surface water and groundwater resources.
- **WR3-1.** Compliance with the terms and conditions for water resource mitigation shall be monitored by the project developer. The developer shall consult with BLM through operations and maintenance of the project, employing an adaptive management strategy and modifications, as necessary and approved by BLM. Specifics require how the developer shall maintain the water resource design elements during operations and maintenance of the project.
- **WR4-1.** Reclamation of the project site shall begin immediately after decommissioning to reduce the likelihood of water resource impacts from project activities. Developers shall coordinate with BLM in advance of interim/final reclamation to have BLM or other designated resource specialists on site during reclamation to work on implementing water resource requirements and BMPs. Specific methods are presented for minimizing water resource impacts associated with reclamation and decommissioning activities.

Typical Mitigation Measures

The No Project Alternative would not include CMAs that are applicable to the action alternatives. Mitigation measures typically implemented to protect surface water resources include those listed here.

- **Drainage Erosion and Sedimentation Control Plan.** Lead agency stipulations typically require developers to address appropriate methods and actions, both temporary and permanent, for the protection of water quality and soil resources, and to demonstrate both no increase in off-site flooding and all monitoring and maintenance activities. Areas of clearing and grading will be defined. Treatments for exposed soils will also be defined, including dust palliatives. BMPs typically include measures designed to prevent wind and water erosion, including application of chemical dust palliatives after rough grading to limit water use. BMPs also include measures to control dust and stabilize construction access roads and entrances.
- **Waste Discharge Requirements.** These requirements relate to both discharges or potential discharges of waste that could affect the quality of waters of the United States or the state, and are typically developed in consultation with staff of the SWRCB and applicable California Regional Water Quality Control Boards (Water Boards).
- **Stormwater Diversion.** For projects that include stormwater diversion channels for routing stormwater through or around a proposed renewable energy development, measures are generally implemented to ensure that channels are maintained throughout the life of the project. Requirements may define sediment removal activities, vegetation management, bank protection and grade control, routine maintenance, and procedures for protection of downstream properties.

IV.5.3.1.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

The No Action Alternative has no new conservation designations, but without approval of an action alternative, there would be continued protection of existing LLPAs like wilderness areas. In addition, under the No Action Alternative, renewable energy projects would continue to be evaluated and approved with project-specific mitigation requirements.

As summarized in Table IV.5-2 for the No Action Alternative (see Appendix R2, Table R2.5-4 for complete data), conservation of existing 100-year floodplains on BLM lands in the DRECP area associated with ACECs could account for 23,845 acres, representing about 18% of the total mapped 100-year floodplain acreage on BLM lands in the DRECP area.

Table IV.5-2
Potential Conservation of Mapped 100-Year Floodplain on BLM Lands in the DRECP Area (acres) – No Action Alternative

	Existing ACEC	Total
Potential Conservation of 100-year Floodplains on BLM Lands in the DRECP area	23,845	23,845
Total 100-year Floodplains on BLM Lands in the DRECP area	132,595	132,595
Percent of 100-year Floodplains that Could be Conserved on BLM Lands	18.0%	18.0%

Note: Full data tables are available in Appendix R2.
The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

As indicated in Table R2.5-5 and Table R2.5-6 (Appendix R2) for the No Action Alternative, conservation of linear and areal surface water resources on BLM lands in the DRECP area could amount to 17% of the 80,000 miles of linear features and 10% of the 182,000 acres of areal surface water resources.

IV.5.3.1.3 Impacts of Transmission Outside the DRECP Area

Outside the DRECP area, additional transmission lines would be needed to deliver renewable energy generation to load centers (areas of high demand). It is assumed that new transmission lines outside the DRECP area would use existing transmission corridors between the DRECP area and existing substations in the more populated coastal areas of the state. The areas outside the DRECP through which new transmission lines might be constructed are San Diego, Los Angeles, North Palm Springs–Riverside, and Central Valley. These areas are described in Chapter III.5, Section III.5.10, Flood Hazard, Hydrology, and Drainage Areas.

Impact FH-1: Activities could substantially alter existing drainage patterns and increase the risk of flooding on or off site.

Transmission lines may not substantially alter drainage or increase the risk of flooding since transmission towers have small footprints and their footings introduce minimal impervious surface. Transmission tower footings will be located outside surface water features or follow appropriate laws and regulatory processes (Fish and Game Code, Sections 1600-1616, as amended) to avoid and minimize impacts to drainage patterns. Access roads would consist of either existing paved or unpaved roads and would not appreciably alter drainages. Runoff at disturbed sites would be controlled through

implementation of erosion control plans and site restoration, as required by the RWQCB with jurisdiction. Runoff would not be diverted to avoid flooding on adjacent property.

Impact FH-2: Activities could alter hydrologic processes and water-dependent resources of surface water features.

Because of their small footprints and wide spacing, transmission towers are not expected to alter hydrologic process or affect surface water features. Tower footings introduce little to no barriers to flow, and the area around towers is typically restored to pre-construction conditions. Towers are generally not sited in watercourses. If it is necessary to site towers in wide playas, they are protected from erosion and minimally affect flows. Access roads may locally divert overland flows during storm events to prevent erosion, but this would be a localized event and would not disrupt or alter overall hydrologic processes.

Impact FH-3: Activities could result in accidental releases of contaminants resulting in degradation of water quality.

The primary potential contaminant used during transmission line construction would be fuel. Typically, fuel trucks deliver fuel to work sites and refuel equipment directly; fuel is not stored on site. Accidental spills can occur, but fuel vendors are required to have appropriate spill containment available so spills would be cleaned up immediately. Refueling is also typically required to be at least 50 feet from the nearest watercourse.

IV.5.3.2 Preferred Alternative

For the Preferred Alternative, geographically dispersed DFAs would be created, providing siting flexibility for renewable energy development. Additional conservation designations would be implemented through the LUPA.

Figure IV.5-2 shows the geographic distribution of renewable energy facilities within DFAs, relative to surface water resources for the Preferred Alternative. Major surface water resources that could experience development under the Preferred Alternative include the Mojave and Colorado rivers.

IV.5.3.2.1 Impacts of Renewable Energy and Transmission Development

The types of impacts that would occur for the Preferred Alternative would be similar to impacts for the No Action Alternative. Please see Section IV.5.2.1 for a more detailed description of impacts common to all alternatives. The following assessment is limited to alternative-specific measures.

Impact FH-1: Activities could substantially alter existing drainage patterns and increase the risk of flooding on or off site.

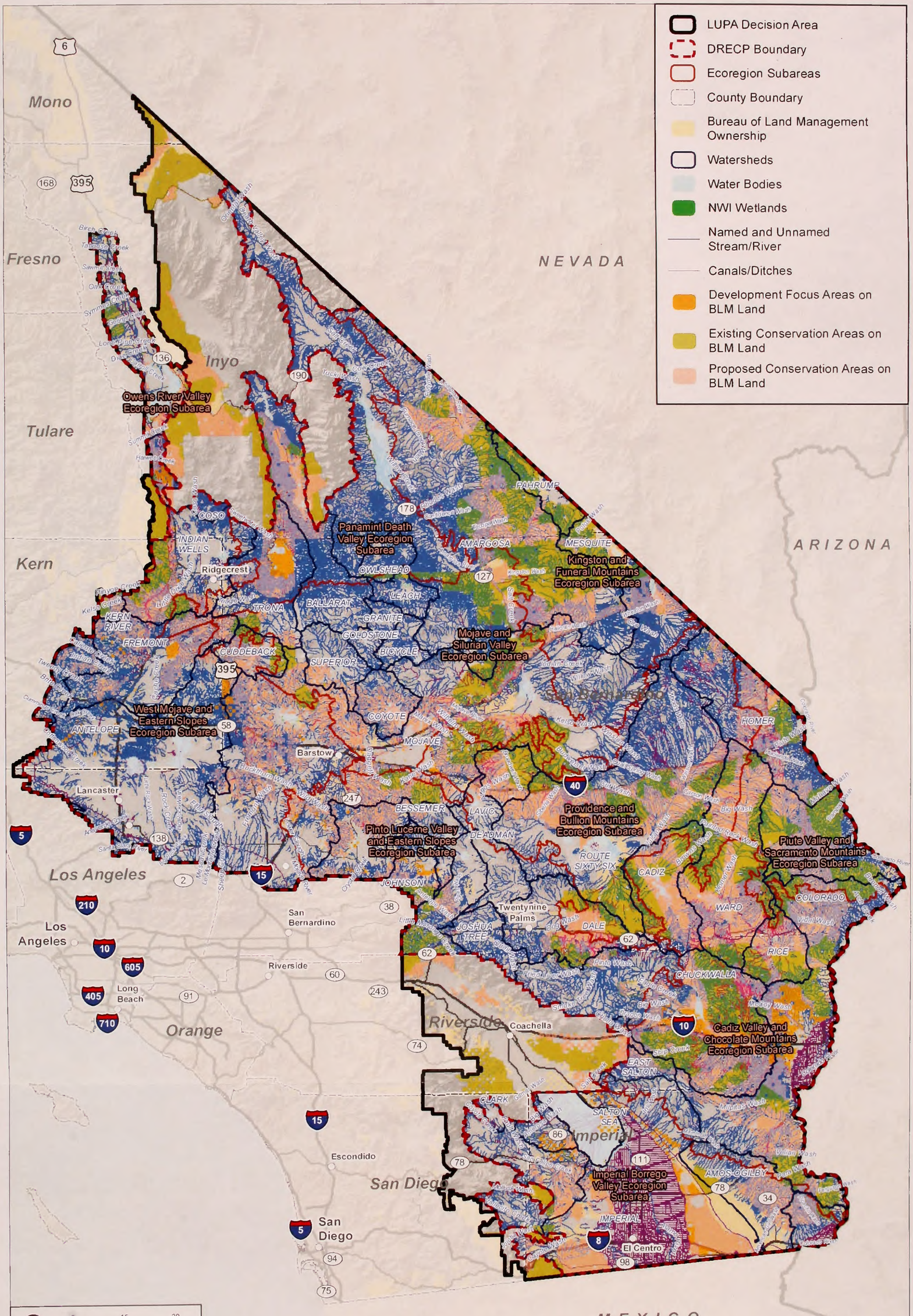
The following measure of potential activity within the 100-year floodplain indicates that potential adverse impacts from development can substantially alter drainage patterns and increase the risk of flooding.

As summarized in Table IV.5-3 for the Preferred Alternative (see Appendix R2, Table R2.5-7 for complete data), development within the 100-year floodplain on BLM lands in the DRECP area could occupy about 3,420 acres. This represents about 1.7% of the total mapped 100-year floodplain area of the DRECP area . Solar energy represents about two thirds of this small percentage of potential development, mostly in the Cadiz Valley and Chocolate Mountains, and West Mojave and Eastern Slopes ecoregion subareas. This would suggest that development within the 100-year floodplain on BLM lands in the DRECP area would avoid impacting over 98% of the 100-year floodplain. However, it is important to recognize that, overall, 72% of the DRECP area has not yet been assessed for flood potential; so development on BLM lands within the 100-year floodplain could occupy more than 1.7% of BLM lands in the DRECP area. CMAs would require areas that have not been previously assessed by FEMA to undergo hydrologic study to determine the 100-year floodplain in proximity to the project, and to avoid development within the floodplain if possible.

Table IV.5-3
Potential Development Within Mapped 100-Year Floodplains on BLM Lands in the DRECP Area (acres) – Preferred Alternative

	Solar	Wind	Geothermal	Transmission	Total
Potential Development Within 100-year Floodplains that Could be Developed on BLM Lands in the DRECP area	2,397	88	669	266	3,420
Total 100-year Floodplains on BLM Lands in the DRECP area	194,717	194,717	194,717	194,717	194,717
Percent of 100-year Floodplains that Could be Developed on BLM Lands in the DRECP area	1.2%	0%	0.3%	0.1%	1.7%

Note: Full data tables are available in Appendix R2.
The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.



Sources: ESRI (2014); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); USGS (2011); RECON (2015)

FIGURE IV.5-2

Linear and Areal Surface Water Resources and Watersheds in the DRECP Plan Area - Preferred Alternative

DRECP Proposed LUPA and Final EIS

October 2015

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Impact FH-2: Activities could alter hydrologic processes and water-dependent resources of surface water features.

The following measures of potential activity within surface water features show that there could be potential adverse effects from project development within or near these surface water resources. While Table R2.5-8 and Table R2.5-9 in Appendix R2 suggest the potential development impacts to linear and areal surface water resources would be minimal on an overall basis within BLM lands in the DRECP area, representing potential impacts to 0.4% of linear and 2.3% of areal surface water resources, it is important to recognize the data limitations. Impacts to linear surface water features could potentially be underestimated since the available data is limited to only the centerline lengths rather than the areal extent of these features, as defined by their streambeds and channel banks and additional surface water features that have not been mapped.

Impact FH-3: Activities could result in accidental releases of contaminants resulting in degradation of water quality.

Section IV.5.3.1.1, No Action Alternative, presents a detailed description of Impact FH-3, which is common to all alternatives.

Impacts on Variance Process Lands

Variance Process Lands represent the BLM Solar PEIS Variance Lands as screened for the Proposed LUPA based on BLM screening criteria. Development of renewable energy projects on Variance Process Lands would not require LUPA; the environmental review process would be simpler than if the location were left undesignated. However, all solar, wind, and geothermal energy development applications would have to follow a variance process before BLM could determine whether to continue with processing them (see Volume II, Section II.3.3.3.2 for variance process details).

Development on Variance Process Lands would impact hydrologic resources in the same manner as described for impacts FH-1 through FH-3.

Impact Reduction Strategies

The implementation of the Proposed LUPA would result in conservation of some desert lands as well as development of renewable energy generation and transmission facilities on other lands. There are two ways that impacts from renewable energy development covered by the Proposed LUPA would be lessened. First, the Proposed LUPA incorporates CMAs for each alternative, including ecological and cultural conservation designations and other LUPA components. Second, the implementation of existing laws, orders, regulations and standards would reduce the impacts of project development on a project-by-project basis.

Design Features of the Solar PEIS

The Solar Programmatic EIS (PEIS) includes numerous Design Features (Appendix W) that would reduce the impacts of solar energy development, including measures to minimize erosion and runoff. These are the same as summarized for the No Project Alternative in Section IV.5.3.1.1.

Conservation and Management Actions

The conservation strategy for the Preferred Alternative (presented in Volume II, Section II.3.4) defines specific actions that would reduce the impacts of this alternative. The conservation strategy includes definition of the conservation designations and specific CMAs for the Preferred Alternative.

Similar among all action alternatives are CMAs that would effectively reduce impacts to surface water resources even though the potential impact exposure varies by the location of surface water in proximity to areas designated for development and conservation. The primary CMAs include:

- **LUPA-SW-1** Providing measures to protect the quantity and quality of all water resources (including ephemeral, intermittent, and perennial water bodies) and any associated riparian habitat.
- **LUPA-SW-2** Determining buffer zones, setbacks, and activity limitations that protect soil and water resources, on a site-specific basis;
- **LUPA-SW-14** Maintaining all riparian areas either at or brought to proper functioning.
- **LUPA-SW-17** Precluding construction within, or alteration of, 100-year floodplains where possible, and permitting only when all required permits from other agencies have been obtained. The 100-year floodplain would be determined by hydrologic modeling and analysis if not already determined by FEMA.

For any activity that proposes to utilize groundwater resources, the following stipulated CMAs would apply, regardless of project location:

- **LUPA-SW-21** If possible, all unavoidable impacts on surface waters shall be mitigated to ensure no net negative impact on surface waters.
- **LUPA-SW-22** Consideration shall be given to design alternatives that maintain existing hydrology of the site or redirect excess flows created by hardscapes and reduced permeability from surface waters to areas where they will dissipate by percolation into the landscape.
- **LUPA-SW-23** Degradation of water quality will be minimized by avoiding all hydrologic alterations that could reduce water quality for all applicable beneficial uses.

DRECP CMAs require that the siting and design of Covered Activities maintain the function of natural surface water processes, groundwater processes, hydrogeomorphic processes, and hydrologic regimes. Existing laws and regulations associated with wetlands and water features would also apply to Covered Activities. Additionally, the Riparian and Wetland Natural Communities and Covered Species CMAs will provide additional avoidance and minimization that will contribute to maintaining and promoting hydrologic function.

A summary of the Biological Resource CMAs influencing conservation of water resources and their associated values for all alternatives in the DRECP area is presented here:

- LUPA-BIO-3 would establish setbacks to avoid and buffer certain vegetation types, including but not limited to those in the riparian or wetland vegetation groups: seeps, springs, perennial and intermittent streams, wetlands, and agricultural canal and drain facilities. For the Mojave River, the setback would be the edge of the mapped riparian vegetation or the FEMA 100-year floodplain, whichever is greater.
- LUPA-BIO-9 would reduce impacts to water resources by implementing standard practices that would prevent water erosion and sediment transport and requiring proper containment of hazardous materials and wastes. This would include preparing a site-specific drainage, erosion, and sediment control plan for all phases of the project. It would also require that the siting and design of Covered Activities maintain the function of natural surface water processes, groundwater processes, hydrogeomorphic processes, and hydrologic regimes. Existing laws and regulations associated with wetlands and water features would also apply to Covered Activities.
- LUPA-BIO-14 would reduce the impacts of ground disturbance to water resources by requiring, to the maximum extent workable, that construction equipment and vehicles use existing roads and utility corridors and avoid cross-country travel. Within the project boundaries, cross-country vehicle and equipment use would be prohibited outside of approved designated work areas.

The BLM development standards within the CDCA address water quality so that surface water and groundwater comply with the Clean Water Act and other water quality requirements, including California standards, so that:

- The following do not exceed the applicable requirements: chemical constituents, water temperature, nutrient loads, fecal coliform, turbidity, suspended sediment, and dissolved oxygen.
- Standards are achieved for riparian, wetlands, and water bodies.
- Aquatic organisms and plants (e.g., macro-invertebrates, fish, algae, and plants) indicate support for beneficial uses.
- Monitoring results or other data show that water quality is meeting BLM standards.

The CMAs for the Preferred Alternative related to flood, hydrology and drainage areas would:

- Preclude construction within or alteration of 100-year floodplains where possible, and permitting only when all required permits from other agencies are obtained. The 100-year floodplain would be determined by hydrologic modeling and analysis if not already designated by FEMA.
- Establish exclusion areas in all wetlands, riparian areas (seeps, springs, perennial and intermittent streams), playas (dry lake beds), and Wild and Scenic River corridors, and limit effects to less than 5% of the total resource within project rights-of-way (ROWs), or those that can be adequately mitigated;
- Establish buffer zones, riparian setbacks, no-development areas, and others, determined on a site-specific basis. In general, placement of permanent facilities within buffers or protected zones will be discouraged, but may be permitted if water and riparian resource management objectives can be maintained and if critical resources including Threatened and Endangered species are fully protected.
- Sections 404 and 401 of the CWA and Fish and Game Code Section 1600 et seq. address dry washes within the proposed ROW that have been or likely will be federal or state jurisdictional waters.
- Section 402 of the CWA and Fish and Game Code Section 5650 et seq. will be followed for any activity determined to be a point source of pollution.
- Reduce ground disturbance to water resources by requiring to the maximum extent feasible that construction equipment and vehicles use existing roads and utility corridors and avoid cross-country travel. Within the project boundaries, cross-country vehicle and equipment use would be prohibited outside of approved work areas.
- Reduce impacts to water resources by implementing standard practices that would prevent water erosion and sediment transport and require proper containment of hazardous materials and wastes. This would include preparing a site-specific drainage, erosion and sediment control plan for all phases of the project.

Laws and Regulations

Similar to the No Action Alternative, existing laws and regulations will reduce certain impacts of Plan implementation. Relevant regulations are presented in the Regulatory Setting in Volume III. The requirements of relevant laws and regulations are summarized for the No Action Alternative in Section IV.5.3.1.1.

IV.5.3.2.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

Setting aside lands for no disturbance is a beneficial effect for surface water resources because road crossings and ground disturbance would be avoided in the vicinities of linear and areal surface water resources. Exacerbation of flood effects and degradation of water quality would not occur because there would be no alteration to the drainage area and natural hydrologic processes within the 100-year floodplain. To the extent developments are avoided within drainage areas, they would also avoid potential contamination of soil and water from project-related hazardous materials and wastes.

As summarized in Table IV.5-4 (See Appendix R2 Table R2.5-10 for complete data), BLM's conservation designations could conserve about 54% of the mapped 100-year floodplain area on BLM lands in the DRECP area with the Preferred Alternative.

Table IV.5-4
Potential Conservation Within Mapped 100-Year Floodplain From Conservation Designations on BLM Lands in the DRECP Area (acres) – Preferred Alternative

SUMMARY: Potential Conservation of 100-year Floodplains on BLM Lands in the DRECP Area	NLCS	ACEC	Wildlife	Wilderness Characteristics	Trail	Total
Potential Conservation of 100-year Floodplains on BLM Lands in the DRECP area	67,448	10,115	40	11,911	16,346	105,860
Total 100-year Floodplains on BLM Lands in DRECP area	194,717	194,717	194,717	194,717	194,717	194,717
Percent of 100-year Floodplains Conserved on BLM Lands in the DRECP area	35%	5%	0%	6%	8%	54%

Note: Full data tables are available in Appendix R2.
The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

As indicated in Table R2.5-11 and Table R2.5-12 (Appendix R2), BLM's conservation designations could exclude from development 70% of the 36,000 miles of linear features, and 34% of the 244,000 acres of areal surface water features on BLM lands in the DRECP area.

IV.5.3.2.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside the DRECP area on flooding, hydrology, and drainage would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.5.3.1.3, Impacts of Transmission Outside the DRECP Area in No Action Alternative.

IV.5.3.2.4 Comparison of the Preferred Alternative With No Action Alternative

This section summarizes the comparison of the Preferred Alternative with the No Action Alternative. While there is data that provide some basis for comparison, it is important to recognize that the No Action Alternative lacks guiding principles for locating facilities and would not result in the consistent and comprehensive application of CMAs as it would in the Preferred Alternative. The magnitude of detrimental environmental effects can therefore potentially be greater than for the No Action Alternative, regardless of results from the available metrics used to compare the alternatives.

A comparison follows of the Preferred and No Action Alternatives and how renewable energy development would impact water resources on BLM lands:

- The Preferred Alternative could allow development of up to 1.7% of the total mapped 100-year floodplain compared to 1.0% for the No Action Alternative.
- The Preferred Alternative could allow development of up to 0.4% of linear surface water features compared to 0.8% for the No Action Alternative.
- The Preferred Alternative could allow development of up to 2.3% of areal surface water features compared to 0.2% for the No Action Alternative.

Comparison of the Preferred and No Action Alternatives with respect to BLM's conservation designations of surface water resources follows:

- The Preferred Alternative could conserve 54% of the total mapped 100-year floodplain compared to 18% for the No Action Alternative.
- The Preferred Alternative could conserve 70% of linear surface water features compared to 17% for the No Action Alternative.
- The Preferred Alternative could conserve 34% of areal surface water features compared to 10% for the No Action Alternative.

IV.5.3.3 Alternative 1

For Alternative 1, geographically confined DFAs would be small, with an emphasis on solar and geothermal energy development. Additional conservation designations would be made through the LUPA.

Figure IV.5-3 shows the geographic distribution of both projects and conservation areas in relation to surface water resources for Alternative 1. Major surface water resources that could be developed under Alternative 1 include the Mojave and Colorado rivers.

IV.5.3.3.1 Impacts of Renewable Energy and Transmission Development: Alternative 1

The types of impacts that would occur for Alternative 1 would be similar to impacts for the No Action Alternative. Please see Section IV.5.3.1.1 for a more detailed description of impacts common to all alternatives.

Impact FH-1: Activities could substantially alter existing drainage patterns and increase the risk of flooding on or off site.

The following measure of potential activity within the 100-year floodplain shows potential adverse effects from development that could lead to substantially altering drainage patterns and increase the risk of flooding.

As summarized in Table IV.5-5 for Alternative 1 (see Appendix R2 Table R2.5-13 for complete data), development within currently assessed 100-year floodplains on BLM lands in the DRECP area could occupy about 502 acres. This represents about 0.4% of the total mapped 100-year floodplain area of BLM lands in the DRECP area. Solar energy represents about three quarters of this small percentage of potential development that could be built within the mapped 100-year floodplain, mostly in the Imperial Borrego Valley, Pinto Lucerne Valley and Eastern Slopes, and West Mojave and Eastern Slopes ecoregion subareas. As assessed currently, this would suggest that development within the 100-year floodplain on BLM lands in the DRECP area would not adversely impact 99% of the 100-year floodplain. However, it is important to recognize that, overall, 72% of the DRECP area has not been assessed for flood potential, suggesting that development on BLM lands within the 100-year floodplain could occupy more than 0.4%. The CMAs would require areas that have not been previously assessed by FEMA to undergo hydrologic study to determine the 100-year floodplain in proximity to the project, and to avoid development within the floodplain if possible.

Table IV.5-5
Potential Development Within Mapped 100-Year Floodplains on BLM Lands in the DRECP Area (acres) – Alternative 1

	Solar	Wind	Geothermal	Transmission	Total
Potential Development Within 100-year Floodplains on BLM Lands in DRECP Area	343	0	42	116	502
Total 100-year Floodplains on BLM Lands in the DRECP Area	132,595	132,595	132,595	132,595	132,595
Percent of 100-Year Floodplains Potentially Developed on BLM Lands in the DRECP Area	0.3%	0.0%	0.0%	0.1%	0.4%

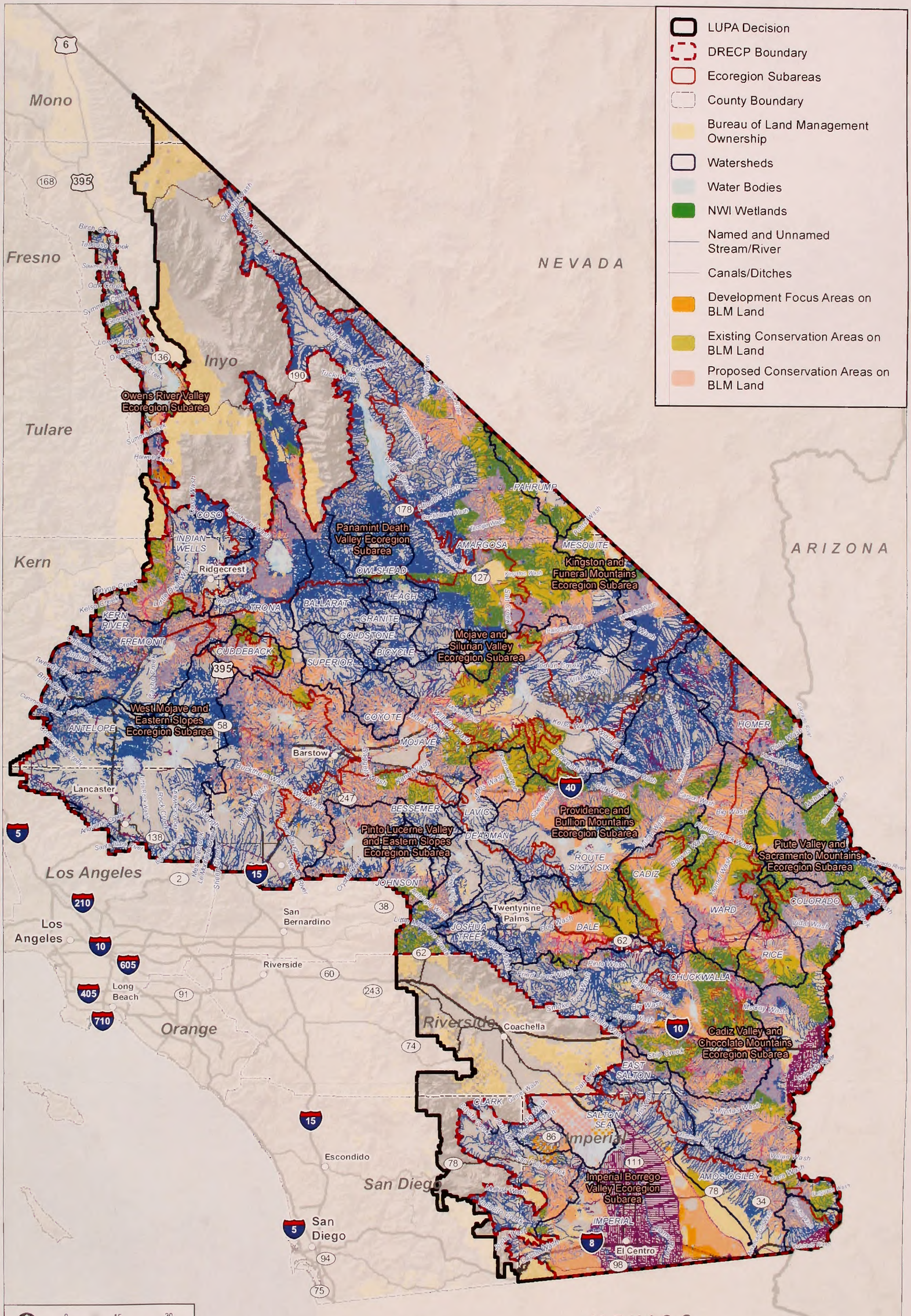
Note: Full data tables are available in Appendix R2.
The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

Impact FH-2: Activities could alter hydrologic processes and water-dependent resources of surface water features.

The following measures of potential activity within surface water features indicate potential adverse impacts from development within or near these surface water resources. While Table R2.5-14 and Table R2.5-15 in Appendix R2 suggest that potential development impacts to linear and areal surface water resources would be minimal overall within BLM lands in the DRECP area (representing potential impacts to 0.3% of linear and 0.1% of areal surface water resources), it is important to recognize the data limitations. There is the potential to underestimate impacts to linear surface water features since available data is limited to centerline lengths rather than to the areal extent of these features, as defined by their streambeds and channel banks.

Impact FH-3: Activities could result in accidental releases of contaminants resulting in degradation of water quality.

Please see Section IV.5.3.1 for the No Action Alternative for a more detailed description of Impact FH-3.



Sources: ESRI (2014); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); USGS (2011); RECON (2015)

FIGURE IV.5-3

Linear and Areal Surface Water Resources and Watersheds in the DRECP Plan Area - Alternative 1

DRECP Proposed LUPA and Final EIS

October 2015

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Impacts on Variance Process Lands

Variance Process Lands represent BLM Solar PEIS Variance Lands screened for the Proposed LUPA, based upon BLM screening criteria. Development of renewable energy on Variance Process Lands would not require LUPA; the environmental review process would be simpler than if the location were left undesignated. However, all solar, wind, and geothermal energy development applications would have to follow a variance process before BLM could determine whether to continue with processing them (see Volume II, Section II.3.3.3.2 for details of the variance process).

Under Alternative 1, there are 37,000 acres of Variance Process Lands in the LUPA Decision Area. Development on Variance Process Lands would impact hydrologic resources in the same manner as described for impacts FH-1 through FH-3.

Impact Reduction Strategies

The implementation of the Proposed LUPA would result in the conservation of some desert lands as well as the development of renewable energy generation and transmission facilities on other lands. There are several ways that impacts from renewable energy development covered by the Proposed LUPA would be lessened. First, the Proposed LUPA incorporates CMAs for each alternative, including specific ecological and cultural conservation designations. Also, the implementation of existing laws, orders, regulations and standards would reduce the impacts of project development.

Design Features of the Solar PEIS

The Solar PEIS includes numerous Design Features (Appendix W) that would reduce impacts of solar energy development, including measures to minimize erosion and runoff. These are the same as summarized for the No Project Alternative in Section IV.5.3.1.1.

Conservation and Management Actions

The conservation strategy for Alternative 1 (presented in Volume II, Section II.4.4) defines specific actions that would reduce the impacts of this alternative. The conservation strategy includes definition of the conservation designations and specific CMAs, as defined for the Preferred Alternative in Section IV.5.3.2.1.

Laws and Regulations

Similar to the No Action Alternative, existing laws and regulations will reduce certain impacts of Plan implementation. Relevant regulations are presented in the Regulatory

Setting in Volume III. The requirements of relevant laws and regulations are summarized for the No Action Alternative in Section IV.5.3.1.1.

IV.5.3.3.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

Setting aside lands for no disturbance is a beneficial effect for surface water resources because road crossings and ground disturbance would be avoided within and in the vicinity of linear and areal surface water resources. Exacerbation of flood effects and degradation of water quality would not occur because there would not be any alteration to the drainage area and natural hydrologic processes within the 100-year floodplain. To the extent development is avoided within drainage areas, it would also avoid potential for contamination to soil and water from project-related hazardous materials and wastes.

As summarized in Table IV.5-6 (see Appendix R2 Table R2.5-16 for complete data), BLM's conservation designations could conserve about 65% of the area of mapped 100-year floodplain on BLM lands in the DRECP area associated with Alternative 1.

Table IV.5-6
Potential Conservation of Mapped 100-Year Floodplain from Conservation Designations on BLM Lands in the DRECP Area (acres) – Alternative 1

SUMMARY: Potential Conservation of 100-year Floodplains on BLM Lands in the DRECP Area	NLCS	ACEC	Wildlife	Wilderness Characteristics	Trail	Total
Potential Conservation of 100-year Floodplains on BLM Lands in the DRECP Area	21,204	44,646	5,005	13,174	2,293	86,322
Total 100-year Floodplain Acreage on BLM Lands in DRECP Area	132,595	132,595	132,595	132,595	132,595	132,595
Percent of 100-year Floodplains that Could be Conserved on BLM Lands in the DRECP Area	16.0%	33.7%	3.8%	9.9%	1.7%	65.1%

Note: Full data tables are available in Appendix R2.
The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

As indicated in Table R2.5-17 and Table R2.5-18 (in Appendix R2), BLM's conservation designations would exclude from development 64% of the linear surface water features among the total 36,000 miles of linear features, and would exclude from development 58% of the areal surface water features among the total 182,000 acres of areal surface water features on BLM lands in the DRECP area.

IV.5.3.3.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside the DRECP area on flooding, hydrology, and drainage would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.5.3.1.3, Impacts of Transmission Outside the DRECP area, in the No Action Alternative.

IV.5.3.3.4 Comparison of Alternative 1 With Preferred Alternative

A comparison of Alternative 1 and the Preferred Alternative for potential BLM DRECP area development impacts to surface water resources follows:

- Alternative 1 could allow development of up to 0.4% of the total mapped 100-year floodplain compared to 1.7% for the Preferred Alternative.
- Alternative 1 could allow development of up to 0.3% of linear surface water features compared to 0.4% for the Preferred Alternative.
- Alternative 1 could allow development of up to 0.1% of areal surface water features compared to 2.3% for the Preferred Alternative.

Comparison of Alternative 1 and the Preferred Alternative with respect to conservation of surface water resources resulting from conservation designations on BLM lands in the DRECP area follows:

- Alternative 1 could conserve 65% of the total mapped 100-year floodplain compared to 54% for the Preferred Alternative.
- Alternative 1 could conserve 64% of linear surface water features compared to 70% for the Preferred Alternative.
- Alternative 1 could conserve 58% of areal surface water features compared to 34% for the Preferred Alternative.

IV.5.3.4 Alternative 2

For Alternative 2, geographically dispersed and maximized DFAs would have expanded wind energy development opportunities. Additional conservation designations would be made through the LUPA.

Figure IV.5-4 shows the geographic distribution of renewable energy development and conservation areas in relation to surface water resources for Alternative 2. Major surface water resources that could experience development in their vicinity under Alternative 2 include the Mojave and Colorado rivers.

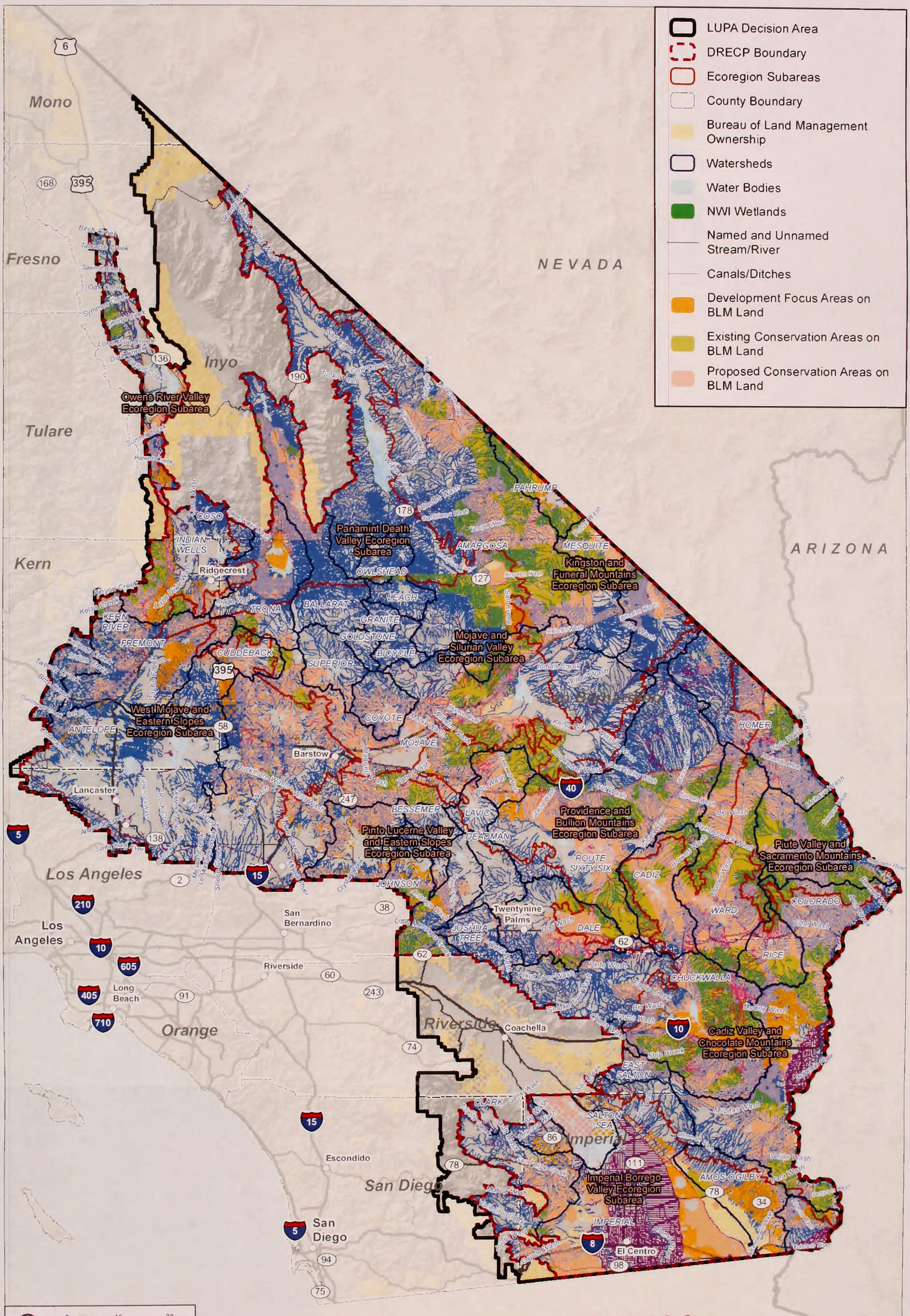
IV.5.3.4.1 Impacts of Renewable Energy and Transmission Development : Alternative 2

The types of impacts that would occur for Alternative 2 would be similar to impacts for the No Action Alternative. Please see Section IV.5.3.1.1 for a more detailed description of impacts common to all alternatives.

Impact FH-1: Activities could substantially alter existing drainage patterns and increase the risk of flooding on or off site.

The following measure of potential activity within the mapped 100-year floodplain indicates the potential adverse effects from development that could lead to substantially altering drainage patterns and increasing the risk of flooding.

As summarized in Table IV.5-7 (see Appendix R2 Table R2.5-19 for complete data), development within the 100-year floodplain on BLM lands in the DRECP area could occupy about 2,062 acres. This represents less than 2% (1.6%) of the total mapped 100-year floodplain on BLM lands in the DRECP area. Solar energy represents about three quarters of this small percentage of potential development. As assessed currently, this would suggest that development within the 100-year floodplain on BLM lands in the DRECP area would avoid impacting 98% of this area. However, it is important to recognize that, overall, 72% of BLM lands in the DRECP area has not been assessed for flood potential, suggesting that development within the 100-year floodplain could occupy more than 2% of the total floodplain. The CMAs require areas that have not been previously assessed by FEMA to undergo hydrologic study to determine the 100-year floodplain in proximity to the project, and to avoid development within the floodplain if possible.



Sources: ESRI (2014); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); USGS (2011); RECON (2015)

FIGURE IV.5-4

Linear and Areal Surface Water Resources and Watersheds in the DRECP Plan Area - Alternative 2

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Table IV.5-7
Potential Development Within Mapped 100-Year Floodplains on BLM Lands in the DRECP Area (acres) – Alternative 2

	Solar	Wind	Geothermal	Transmission	Total
Potential Development Within 100-year Floodplains on BLM Lands in DRECP Area	1,691	129	120	122	2,062
Total 100-year Floodplains on BLM Lands within DRECP Area	132,595	132,595	132,595	132,595	132,595
Percent of Potential Development in 100-Year Floodplains on BLM Lands within DRECP Area	1.3%	0.1%	0.1%	0.1%	1.6%

Note: Full data tables are available in Appendix R2.
The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

Impact FH-2: Activities could alter hydrologic processes and water-dependent resources of surface water features.

The following measures of potential activity within surface water features indicate the potential adverse effects from development within or near these resources. While Table R2.5-20 and Table R2.5-21 in Appendix R2 suggest that potential development impacts to linear and areal surface water resources would be minimal overall within BLM lands in the DRECP area (representing potential impacts to 0.5% of linear and 1.6% of areal surface water resources), it is important to recognize the data limitations. There is the potential to underestimate impacts to linear surface water features since available data is limited to only the centerline lengths rather than to the areal extent of these features, as defined by their streambeds and channel banks.

Impact FH-3: Activities could result in accidental releases of contaminants resulting in degradation of water quality.

Please see Section IV.5.3.1.1 for the No Action Alternative for a more detailed description of Impact FH-3 since it is common to all alternatives.

Impacts on Variance Process Lands

Variance Process Lands represent the BLM Solar PEIS Variance Lands as screened for the Proposed LUPA based on BLM screening criteria. Development of renewable energy on Variance Process Lands would not require a LUPA; the environmental review process

would be somewhat simpler than if the location were left undesignated. However, all solar, wind, and geothermal energy development applications would have to follow a variance process before BLM could determine whether to continue with processing them. (See Volume II, Section II.3.3.3.2 for details of the variance process.)

Development on Variance Process Lands would impact hydrologic resources in the same manner as described for impacts FH-1 through FH-3.

Impact Reduction Strategies

The implementation of the Proposed LUPA would result in conservation of some desert lands as well as the development of renewable energy generation and transmission facilities on other lands. There are two ways that impacts from renewable energy development covered by the Proposed LUPA would be lessened. First, the Proposed LUPA incorporates CMAs for each alternative, including specific ecological and cultural conservation designations and LUPA components. Second, implementation of existing laws, orders, regulations and standards would reduce the impacts of project development.

Design Features of the Solar PEIS

The Solar PEIS includes numerous Design Features (Appendix W) that would reduce the impacts of solar energy development, including measures to minimize erosion and runoff. There are the same as summarized for the No Project Alternative in Section IV.5.3.1.1.

Conservation and Management Actions

The conservation strategy for Alternative 2 (presented in Volume II, Section II.5.4) defines specific actions that would reduce the impacts of this alternative. The conservation strategy defines ecological and cultural conservation designations and specific CMAs for the Preferred Alternative. The CMAs for Alternative 2 are similar to those for the Preferred Alternative. Please see Section IV.5.3.2.1.

Laws and Regulations

Similar to the No Action Alternative, existing laws and regulations will reduce certain impacts of Plan implementation. Relevant regulations are presented in the Regulatory Setting in Volume III. The requirements of relevant laws and regulations are summarized for the No Action Alternative in Section IV.5.3.1.1.

IV.5.3.4.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

Setting aside lands for no disturbance is a beneficial effect for surface water resources because road crossings and ground disturbance would be avoided in the vicinities of linear and areal surface water resources. Exacerbation of flood effects and degradation of water quality would not occur because there would not be any alteration to the drainage area and natural hydrologic processes within the 100-year floodplain. To the extent developments are avoided within drainage areas, it would also avoid potential for contamination to soil and water from project-related hazardous materials and wastes.

As summarized in Table IV.5-8 (see Appendix R2, Table R2.5-22 for complete data), BLM's conservation designations could conserve about 94% the area of mapped 100-year floodplain on BLM lands in the DRECP area associated with Alternative 2.

Table IV.5-8
Potential Conservation of Mapped 100-Year Floodplain from Conservation Designations on BLM Lands in the DRECP Area (acres) – Alternative 2

SUMMARY: Potential Conservation of 100-year Floodplains on BLM Land in DRECP Area	NLCS	ACEC	Wildlife Allocation	Wilderness Characteristics	Trail	Total
Potential Conservation in 100-year Floodplains on BLM Lands	74,062	3,627	1	13,174	33,293	124,157
Total 100-year Floodplains on BLM Lands in the DRECP Area	132,595	132,595	132,595	132,595	132,595	132,595
Percent of 100-year Floodplains that Could be Conserved on BLM Lands in DRECP Area	55.9%	2.7%	0.0%	9.9%	25.1%	93.6%

Note: Full data tables are available in Appendix R2.
The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

As indicated in Table R2.5-23 and Table R2.5-24 (Appendix R2), BLM's conservation designations could exclude from development 93% of the 36,000 miles of the linear surface water features and 72% of the 182,000 acres of areal surface water features on BLM lands in the DRECP area.

IV.5.3.4.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside the DRECP area on flooding, hydrology, and drainage would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.5.3.1.3, Impacts of Transmission Outside the DRECP Area in No Action Alternative.

IV.5.3.4.4 Comparison of Alternative 2 With Preferred Alternative

A comparison of Alternative 2 and the Preferred Alternative with respect to potential BLM DRECP area development impacts to surface water resources follows:

- Alternative 2 could allow development of up to 1.6% of the total mapped 100-year floodplain compared to 1.7% for the Preferred Alternative.
- Alternative 2 could allow development of up to 0.5% of linear surface water features compared to 0.4% for the Preferred Alternative.
- Alternative 2 could allow development of up to 1.6% of areal surface water features compared to 2.3% for the Preferred Alternative.

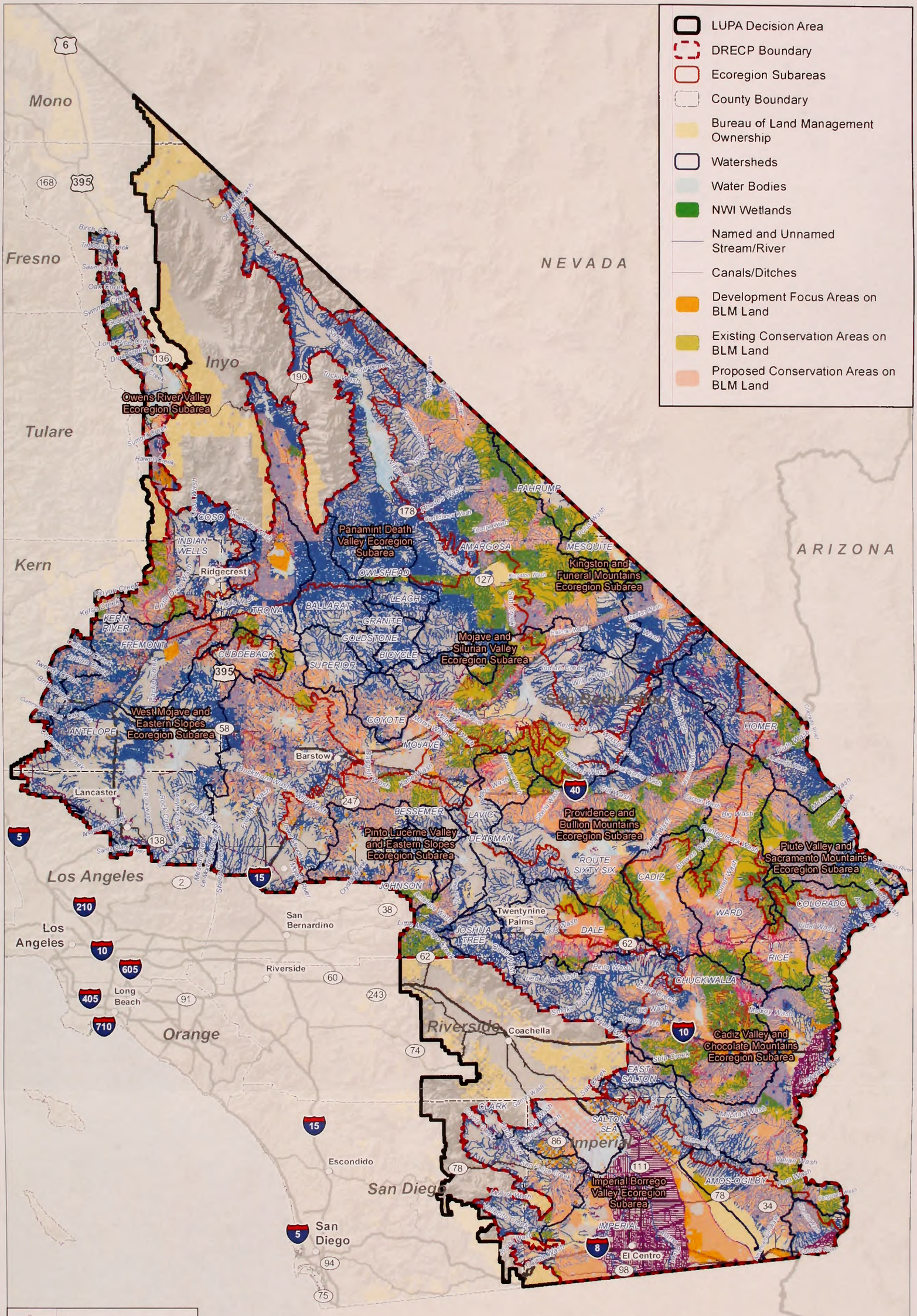
Comparison of Alternative 2 and the Preferred Alternative with respect to conservation of surface water resources resulting from Conservation Designations on BLM lands in the DRECP area follows:

- Alternative 2 could conserve 94% of the total mapped 100-year floodplain compared to 54% for the Preferred Alternative.
- Alternative 2 could conserve 93% of linear surface water features compared to 70% for the Preferred Alternative.
- Alternative 2 could conserve72% of areal surface water features compared to 34% for the Preferred Alternative.

IV.5.3.5 Alternative 3

For Alternative 3, geographically dispersed DFAs would be established primarily for solar and geothermal energy development. Additional conservation designations would be made through the LUPA.

Figure IV.5-5 shows the geographic distribution of renewable energy development and conservation areas in relation to surface water resources for Alternative 3. Major surface water resources that could experience development under Alternative 3 include the Mojave and Colorado rivers.



Sources: ESRI (2014); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); USGS (2011); RECON (2015)

FIGURE IV.5-5

Linear and Areal Surface Water Resources and Watersheds in the DRECP Plan Area - Alternative 3

DRECP Proposed LUPA and Final EIS

October 2015

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IV.5.3.5.1 Impacts of Renewable Energy and Transmission Development: Alternative 3

The types of impacts that would occur for Alternative 3 would be similar to impacts for the No Action Alternative. Please see Section IV.5.3.1.1 for a more detailed description of impacts common to all alternatives.

Impact FH-1: Activities could substantially alter existing drainage patterns and increase the risk of flooding on or off site.

The following measure of potential activity within the mapped 100-year floodplain indicates the potential adverse impacts from development that could lead to substantially altering drainage patterns and increasing the risk of flooding.

As summarized in Table IV.5-9 (see Appendix R2, Table R2.5-25 for complete data), development within the DFA would occupy about 2,141 acres of lands currently assessed as within the mapped 100-year floodplain. This represents about 2% of the total mapped 100-year floodplain area in BLM lands in the DRECP area. Solar energy represents most of this small percentage of potential development that could occur within the mapped 100-year floodplain, mostly in the Imperial Borrego Valley and West Mojave and Eastern Slopes ecoregion subareas. As assessed currently, this would suggest that development within the 100-year floodplain on BLM lands in the DRECP area would avoid impacting 98% of the 100-year floodplain. However, it is important to recognize that overall, 72% of the DRECP area has not been assessed for flood potential, suggesting that development within the 100-year floodplain could occupy more than 2% of the total area of the DFA. The CMAs would require areas that have not been previously assessed by FEMA to undergo hydrologic study to determine the 100-year floodplain in proximity to the project, and to avoid development within the floodplain if possible.

Table IV.5-9
Potential Development Within Mapped 100-Year Floodplains on BLM Lands in the DRECP Area (acres) – Alternative 3

	Solar	Wind	Geothermal	Transmission	Total
Potential Development Within 100-year Floodplains on BLM Lands in DRECP Area	1,829	62	131	119	2,141
Total 100-year Floodplains on BLM Lands in DRECP Area	132,595	132,595	132.595	132,595	132.595
Percent of 100-Year Floodplains that Could be Developed on BLM Lands in the DRECP Area	1.4%	0.0%	0.1%	0.1%	1.6%

Note: Full data tables are available in Appendix R2.
The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the

nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

Impact FH-2: Activities could alter hydrologic processes and water-dependent resources of surface water features.

The following measures of potential activity within surface water features indicate potential adverse impacts from development within or near these surface water resources. While Table R2.5-26 and Table R2.5-27 (in Appendix R2) suggest that potential development impacts to linear and areal surface water resources would be minimal overall within BLM lands in the DRECP area, representing potential impacts to 0.3% of linear and 2.1% of areal surface water resources, it is important to recognize the data limitations. There is the potential to underestimate impacts to linear surface water features since available data is limited to centerline lengths rather than to the areal extent of these features, as defined by their streambeds and channel banks.

Impact FH-3: Activities could result in accidental releases of contaminants resulting in degradation of water quality.

Please see Section IV.5.3.1.1 for the No Action Alternative for a more detailed description of Impact FH-3 since it is common to all alternatives.

Impacts on Variance Process Lands

Variance Process Lands represent the BLM Solar PEIS Variance Lands screened for the Proposed LUPA based on BLM screening criteria. Development of renewable energy on Variance Process Lands would not require a LUPA; the environmental review process would be somewhat simpler than if the location were left undesignated. However, all solar, wind, and geothermal energy development applications would have to follow a variance process before the BLM could determine whether to continue with processing them. (See Volume II, Section II.3.3.3.2 for details of the variance process.)

Development on Variance Process Lands would impact hydrologic resources in the same manner as described for impacts FH-1 through FH-3.

Impact Reduction Strategies

The implementation of the Proposed LUPA would result in conservation of some desert lands as well as the development of renewable energy generation and transmission facilities on other lands. There are several ways in which impacts from renewable energy development covered by the Proposed LUPA would be lessened. First, the Proposed LUPA incorporates CMAs for each alternative, including specific ecological and cultural

conservation designations and LUPA components. Also, the implementation of existing laws, orders, regulations and standards would reduce the impacts of project development.

Design Features of the Solar PEIS

The Solar PEIS includes numerous Design Features (Appendix W) that would reduce the impacts of solar energy development, including measures to minimize erosion and runoff. These are the same as summarized for the No Project Alternative in Section IV.5.3.1.1.

Conservation and Management Actions

The conservation strategy for Alternative 3 (presented in Volume II, Section II.6.4) defines specific actions that would reduce the impacts of this alternative. The conservation strategy includes definition of the ecological and cultural conservation designations and specific CMAs for the Preferred Alternative. The CMAs for Alternative 3 are similar to those for the Preferred Alternative. Please see Section IV.5.3.2.1.1.

Laws and Regulations

Similar to the No Action Alternative, existing laws and regulations will reduce certain impacts of Plan implementation. Relevant regulations are presented in the Regulatory Setting in Volume III. The requirements of relevant laws and regulations are summarized for the No Action Alternative in Section IV.5.3.1.1.

IV.5.3.5.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

Setting aside lands for no disturbance is a beneficial effect for surface water resources because road crossings and ground disturbance would be avoided in the vicinities of linear and areal surface water resources. Exacerbation of flood effects and degradation of water quality would not occur because there would not be any alteration to the drainage area and natural hydrologic processes within the 100-year floodplain. To the extent developments are avoided within drainage areas, it would also avoid potential for contamination to soil and water from project-related hazardous materials and wastes.

As summarized in Table IV.5-10 (see Appendix R2, Table R2.5-28 for complete data), BLM's conservation designations would conserve about 83% of the area of mapped 100-year floodplain on BLM lands in the DRECP area associated with Alternative 3.

Table IV.5-10
Potential Conservation of Mapped 100-Year Floodplain from Conservation Designations on BLM Lands in the DRECP Area (acres) – Alternative 3

	NLCS	ACEC	Wildlife	Wilderness Characteristics	Trail	Total
Potential Conservation of 100-year Floodplains on BLM Lands in the DRECP Area	70,615	6,545	42	13,174	19,984	110,360
Total 100-year Floodplains on BLM Lands in the DRECP Area	132,595	132,595	132,595	132,595	132,595	132,595
Percent of 100-year Floodplains that Could be Conserved on BLM Lands in the DRECP Area	53.2%	4.9%	0.0%	9.9%	15.1%	83.2%

Note: Full data tables are available in Appendix R2.
The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

As indicated in Table R2.5-29 and Table R2.5-30 (Appendix R2), BLM's conservation designations could exclude from development 79% of the 36,000 miles of linear features, and 64% of the 182,000 acres of areal surface water features on BLM lands in the DRECP area.

IV.5.3.5.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside the DRECP area on flooding, hydrology, and drainage would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.5.3.1.3, Impacts of Transmission Outside the DRECP Area in No Action Alternative.

IV.5.3.5.4 Comparison of Alternative 3 With Preferred Alternative

Comparison of Alternative 3 and the Preferred Alternative with respect to the potential for BLM DRECP area development impacts to surface water resources follows:

- Alternative 3 could allow development of up to 1.6% of the total mapped 100-year floodplain compared to 1.7% for the Preferred Alternative.

- Alternative 3 could allow development of up to 0.3% of linear surface water features compared to 0.4% for the Preferred Alternative.
- Alternative 3 could allow development of up to 2.1% of areal surface water features compared to 2.3% for the Preferred Alternative.

Comparison of Alternative 3 and the Preferred Alternative with respect to conservation of surface water resources resulting from conservation designations on BLM lands in the DRECP follows:

- Alternative 3 could conserve 83% of the total mapped 100-year floodplain compared to 83.5% for the Preferred Alternative.
- Alternative 3 could conserve 79% of linear surface water features compared to 78.2% for the Preferred Alternative.
- Alternative 3 could conserve 64% of areal surface water features compared to 54.4% for the Preferred Alternative.

IV.5.3.6 Alternative 4

For Alternative 4, geographically dispersed DFAs would be designated with a mix of solar, wind and geothermal energy development. Additional conservation designations would be made through the LUPA.

Figure IV.5-6 shows the geographic distribution of renewable energy development and conservation areas in relation to surface water resources for Alternative 4. Major surface water resources that could be developed in their vicinities under Alternative 4 include the Mojave and Colorado rivers.

IV.5.3.6.1 Impacts of Renewable Energy and Transmission Development: Alternative 4

The types of impacts that would occur for Alternative 4 would be similar to impacts for the No Action Alternative. Please see Section IV.5.3.1.1 for a more detailed description of impacts common to all alternatives. The following assessment is limited to alternative-specific measures.

Impact FH-1: Activities could substantially alter existing drainage patterns and increase the risk of flooding on or off site.

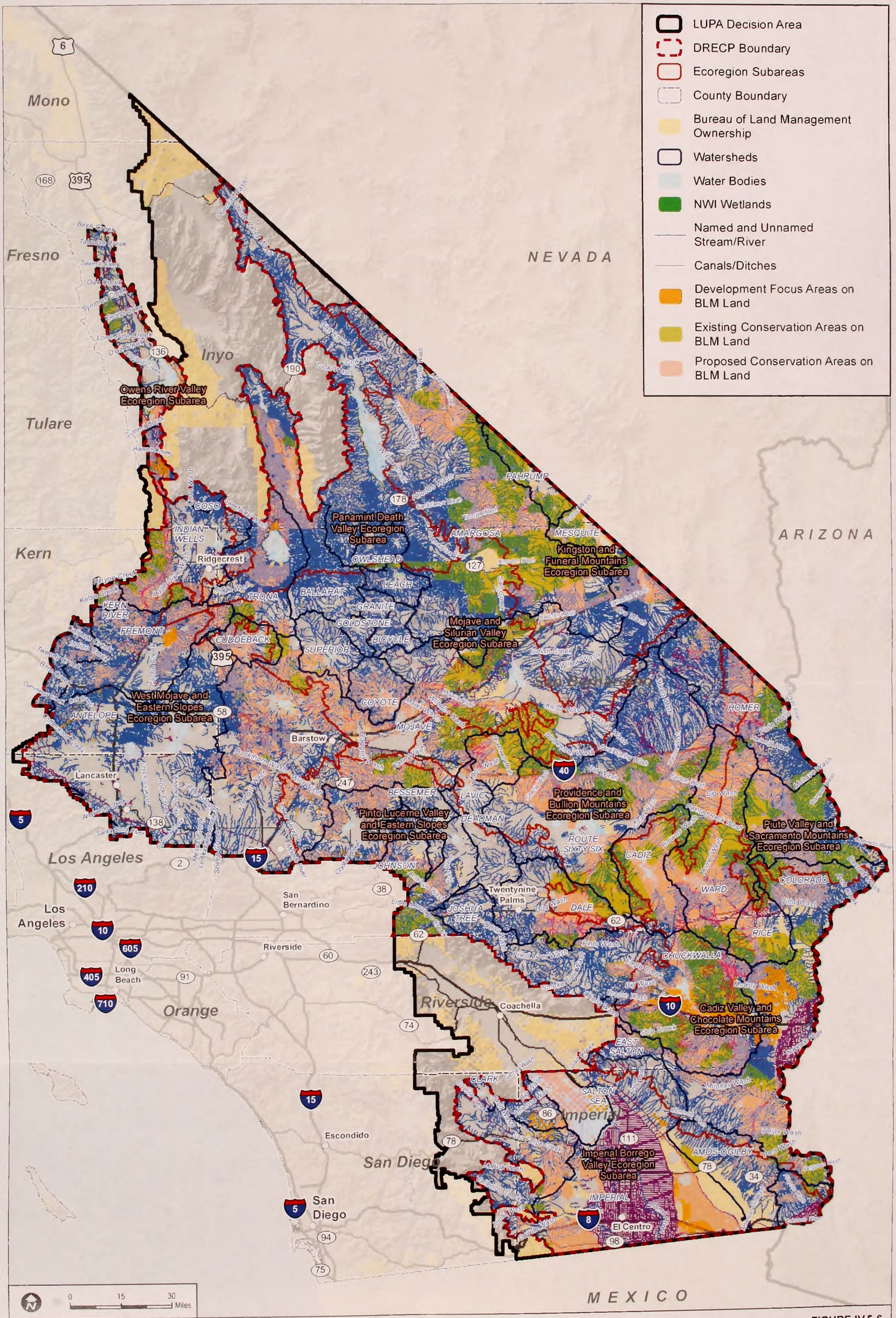
The following measure of potential activity within the mapped 100-year floodplain indicates the potential adverse impacts that could lead to substantially altering drainage patterns and increasing the risk of flooding.

As summarized in Table IV.5-11 (see Appendix R2, Table R2.5-31 for complete data), development within BLM lands in the DRECP area could occupy about 1,352 acres of lands currently assessed as being within the mapped 100-year floodplain. This represents about 1% of the total mapped 100-year floodplain on BLM lands in the DRECP area. Solar energy represents almost three quarters of this small percentage of potential development that could occur within the mapped 100-year floodplain, mostly in the Cadiz Valley and Chocolate Mountains, with less in Imperial Borrego Valley, and West Mojave and Eastern Slopes ecoregion subareas. As assessed currently, this would suggest that development within the 100-year floodplain on BLM lands in the DRECP area would avoid impacting 99% of the 100-year floodplain. However, it is important to recognize that overall, 72% of BLM land in the DRECP area has not been assessed for flood potential, suggesting that development within the 100-year floodplain could occupy more than 1%. The CMAs would require areas that have not been previously assessed by FEMA to undergo hydrologic study to determine the 100-year floodplain in proximity to the project, and to avoid development within the floodplain if possible.

Table IV.5-11
Potential Development Within Mapped 100-Year Floodplains on BLM Lands in the DRECP Area (acres) – Alternative 4

	Solar	Wind	Geothermal	Transmission	Total
Potential Development Within 100-year Floodplains on BLM Lands in the DRECP Area	1,048	79	124	101	1,352
Total 100-year Floodplains on BLM Lands in the DRECP Area	132,595	132,595	132,595	132,595	132,595
Percent of 100-year Floodplains That Could be Developed on BLM Lands in the DRECP Area	0.8%	0.1%	0.1%	0.1%	1.0%

Note: Full data tables are available in Appendix R2.
The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.



Sources: ESRI (2014); CEC (2013); BLM (2015); CDFW (2013); USFWS (2013); USGS (2011); RECON (2015)

FIGURE IV.5-6

Linear and Areal Surface Water Resources and Watersheds in the DRECP Plan Area - Alternative 4

October 2015

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Impact FH-2: Activities could alter hydrologic processes and water-dependent resources of surface water features.

The following measures of potential activity within surface water features indicate the potential adverse effects from development within or near these surface water resources.

While Table R2.5-32 and Table R2.5-33(in Appendix R2) suggest the potential development impacts to linear and areal surface water resources would be minimal on an overall basis within BLM lands of the DRECP area, representing potential impacts to 0.3% of linear and 1.4% of areal surface water resources, it is important to recognize the data limitations. There is the potential to underestimate impacts to linear surface water features since the available data is limited to considering only centerline lengths rather than the areal extent of these features as defined by their streambeds and channel banks.

Impact FH-3: Activities could result in accidental releases of contaminants resulting in degradation of water quality.

Please see Section IV.5.3.1.1 for the No Action Alternative for a more detailed description of Impact FH-3 since it is common to all alternatives.

Impacts on Variance Process Lands

Variance Process Lands represent the BLM Solar PEIS Variance Lands as screened for the Proposed LUPA based on BLM screening criteria. Development of renewable energy on Variance Process Lands would not require a LUPA; the environmental review process would be somewhat simpler than if the location were left undesignated. However, all solar, wind, and geothermal energy development applications would have to follow a variance process before the BLM would determine whether to continue with processing them. (See Volume II, Section II.3.3.3.2 for details of the variance process.)

Development on Variance Process Lands would impact hydrologic resources in the same manner as described for impacts FH-1 through FH-3.

Impact Reduction Strategies

The implementation of the Proposed LUPA would result in conservation of some desert lands as well as the development of renewable energy generation and transmission facilities on other lands. There are two ways in which the impacts of the renewable energy development covered by the Proposed LUPA would be lessened. First, the Proposed LUPA incorporates CMAs for each alternative, including specific ecological and cultural conservation designations and other LUPA components. Second, the implementation of existing laws, orders, regulations and standards would reduce the impacts of project development.

Design Features of the Solar PEIS

The Solar PEIS includes numerous Design Features (Appendix W) that would reduce the impacts of solar energy development, including measures to minimize erosion and runoff. These are the same as summarized for the No Project Alternative in Section IV.5.3.1.1

Conservation and Management Actions

The conservation strategy for Alternative 4 (presented in Volume II, Section II.7.4) defines specific actions that would reduce the impacts of this alternative. The conservation strategy includes definition of the conservation designations and specific CMAs for the Preferred Alternative. The CMAs for Alternative 4 are similar to those for the Preferred Alternative. Please see Section IV.5.3.2.1.

Laws and Regulations

Similar to the No Action Alternative, existing laws and regulations will reduce certain impacts of Plan implementation. Relevant regulations are presented in the Regulatory Setting in Volume III. The requirements of relevant laws and regulations are summarized for the No Action Alternative in Section IV.5.3.1.1.

IV.5.3.6.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

Setting aside lands for no disturbance is a beneficial effect for surface water resources because road crossings and ground disturbance would be avoided in the vicinity of linear and areal surface water resources. Exacerbation of flood effects and degradation of water quality would not occur because there would not be any alteration to the drainage area and natural hydrologic processes within the 100-year floodplain. To the extent that developments are avoided within drainage areas, it would also avoid potential for contamination to soil and water from project-related hazardous materials and wastes.

As summarized in Table IV.5-12 (see Appendix R2, Table R2.5-34 for complete data), BLM's conservation designations could conserve about 65% of the area of mapped 100-year floodplain on BLM lands in the DRECP area associated with Alternative 4.

Table IV.5-12
Potential Conservation of Mapped 100-Year Floodplain From Conservation Designations on BLM Lands in the DRECP Area (acres) – Alternative 4

	NLCS	ACEC	Wilderness Characteristics	Wildlife Allocations	Trail Mgmt	Total
Potential Conservation of 100-year Floodplains on BLM Lands in the DRECP Area	58,272	7,925	13,176	71	6,903	86,347
Total 100-year Floodplains on BLM Lands in the DRECP Area	132,595	132,595	132,595	132,595	132,595	132,595
Percent of 100-year Floodplains that could be Conserved on BLM Lands in the DRECP Area	44%	6.0%	9.9%	0.0%	5.2%	65.1%

Note: Full data tables are available in Appendix R2.
The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore, the subtotals may not sum to the total within the table.

As indicated in Table R2.5-35 and Table R2.5-36 (Appendix R2), BLM's conservation designations could exclude from development about 66% of the 36,000 miles of linear surface water features and 62% of 182,000 acres of areal surface water features on BLM lands in the DRECP area.

IV.5.3.6.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside the DRECP area on flooding, hydrology, and drainage would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.5.3.1.3, Impacts of Transmission Outside the DRECP area in No Action Alternative.

IV.5.3.6.4 Comparison of Alternative 4 With Preferred Alternative

Comparison of Alternative 4 and the Preferred Alternative with respect to potential for BLM DRECP area development impacts to surface water resources follows:

- Alternative 4 could allow development of up to 1.0% of the total mapped 100-year floodplain compared to 1.7% for the Preferred Alternative.

- Alternative 4 could allow development of up to 0.3% of linear surface water features compared to 0.4% for the Preferred Alternative.
- Alternative 4 could allow development of up to 1.4% of areal surface water features compared to 2.3% for the Preferred Alternative.

Comparison of Alternative 4 and the Preferred Alternative with respect to conservation of surface water resources resulting from conservation designations on BLM lands in the DRECP area is summarized as follows:

- Alternative 4 could conserve 65% of the total mapped 100-year floodplain compared to 54% for the Preferred Alternative.
- Alternative 4 could conserve 66% of linear surface water features compared to 70% for the Preferred Alternative.
- Alternative 4 could conserve 62% of areal surface water features compared to 34% for the Preferred Alternative.

IV.6 GROUNDWATER, WATER SUPPLY, AND WATER QUALITY

IV.6.1 Approach to Impact Analysis

This programmatic analysis considers groundwater basins within the Desert Renewable Energy Conservation Plan (DRECP) and Land Use Plan Amendment (LUPA) Decision Area for potential risk and environmental impact severity from proposed renewable energy project development in Development Focus Areas (DFAs). Groundwater basin boundaries and hydrogeological conditions vary within DFA locations. Most environmental impacts on groundwater resources depend less upon developed land area than upon technology, technology type, and water requirements.

Required water use for renewable energy projects is primarily determined by technology (e.g., solar, wind, or geothermal) and technology type (e.g., photovoltaic, concentrated solar thermal). For example, solar thermal plant operations require considerable water for steam generation, cooling, and other industrial processes, while wind projects require relatively little water for operation, maintenance, cleaning, and dust suppression. This programmatic analysis therefore considers estimated water use as the primary indicator of potential environmental impacts to groundwater, water supply, and water quality and recognizes that any increased water use, regardless of technology type, may adversely affect the resource.

Groundwater impacts generally happen at the scale of a groundwater basin rather than at the broader scale of a DRECP ecoregion subarea or DFA. Some impacts occur at even smaller scales (e.g., springs, streams, wetlands, groundwater-dependent vegetation, and water-supply wells within a basin or sub-basin). Quantifying these impacts requires both site-specific and project-specific details, including:

- Net changes in basin water balance, particularly in basins already in overdraft.
- Basin adjudication status and imported water availability.
- Degree of land subsidence.
- Groundwater connections to other basins or the Lower Colorado River Accounting Surface (LCRAS) region.
- Presence of a spring, stream, wetland, or playa that receives and discharges groundwater.
- Presence of groundwater-dependent vegetation.
- Groundwater quality.

- Existing water supply wells, groundwater users, and contributing sources of water discharged from a basin.
- Hydrogeology of water supply aquifers and any interaction with geothermal resources.
- Presence of sole-source aquifers.

Since many of these details are insufficiently quantified, this programmatic analysis uses estimated water use to both identify potential impacts and compare the alternatives; acreage, specifically as it relates to land disturbance, is an additional factor.

In the Proposed LUPA, DFAs represent the magnitude and geographic distribution of renewable energy projects in different alternatives. DFAs are also used to identify and map the locations (groundwater basins within the DRECP area) of impacts, their intensity (as indicated by proposed projects' water consumption in DFAs), and the scale of impacts (as measured by the total acreage disturbed by proposed development). Tables in Appendix R2.6 visually support this analysis and show the acreage of both development and conservation within the DRECP area, arranged by ecoregion subarea.

General metrics used to assess impacts and compare their effects within alternatives include:

- The acres affected by construction and operation, which could alter surface runoff and potentially alter rainfall infiltration, groundwater recharge, and water supply.
- The type of technology (particularly solar and geothermal) and its estimated water requirements. These water requirements affect the volume of pumped groundwater, which can in turn cause drawdown of water levels. Excessive drawdown can cause overdraft conditions, land subsidence, and mobilization of existing poor quality groundwater.
- The geothermal development areas; geothermal projects could adversely impact drinking water supplies when geothermal fluids are either re-injected or stored.
- The renewable energy technology area, where hazardous materials used during construction and operation could spill or be disposed of in a manner that contaminates groundwater.

The location of overdraft and stressed aquifers affects these metrics because they identify areas where groundwater supplies are severely limited. Overdraft is when the amount of water discharged from a particular basin or sub-basin (by pumping, evaporation, outflow, or other means) exceeds the amount of water recharging it (by precipitation, inflow from connected basins, and other inputs). Overdraft is when groundwater levels decline over years and never fully recover, even in wet years. Overdraft can lead to higher extraction

costs, land subsidence, water quality degradation, and adverse impacts to existing users. In this document, California's Department of Water Resources (DWR) identified the basins in overdraft. If discharge remains stable, a new basin equilibrium could be reached; some impacts, however, including to groundwater storage capacity, could be permanently diminished. Stressed aquifers share some characteristics with basins experiencing overdraft but are not formally identified as in overdraft. For purposes of this assessment, basins not formally identified as in overdraft but still characterized by declining water levels are identified as stressed basins. Furthermore, because the basins are all located in a desert environment, any identified water use is significant. The California Statewide Groundwater Elevation Monitoring Program (CASGEM) minimum reported groundwater use for basins is <0.03 acre-feet (ac-ft)/acre. Accordingly, basins with a CASGEM reported water use greater than or equal to 0.03 ac-ft/acre are also considered to be stressed. Overdraft basins are listed in Volume III, Table III.6-1. Overdraft and stressed basins are shown in Figure IV.6-2, and in Section IV.6.3.2.1.

In this programmatic analysis, the volume of water consumed (expressed in either acre-feet per year (ac-ft/yr) or gallons per year) is the key metric for assessing and comparing potential environmental impacts from renewable energy projects to water resources among the alternatives, regardless of the quantity of power generated by consumption of that water (ac-ft of water consumed per megawatt [MW] produced). Water use for solar, wind, and geothermal development varies among the action alternatives. The geographical distribution of water use was estimated using typical consumption rates for different energy technologies and the spatial distribution of their generation within the DRECP area, as described in Appendix O (Methods for Megawatt Distribution).

The amount of electricity generated per unit of water consumed is described in the paragraphs that follow, but these values may change with time as technology continues to improve water-use efficiencies in power facilities. Subsequent project-specific environmental reviews will also more precisely define actual water use by specific technology type using actual operational characteristics (e.g., daytime operations, 24-hour operations, and other factors).

Typical water consumption rates for solar technologies are shown in Volume II, Section II.3.3.1.1. For solar photovoltaic facilities, regular cleaning requires 0.05 ac-ft/yr per MW. Solar thermal consumes more water, and the amount of water required for steam generation, cooling, and other industrial processes can be substantial. Solar thermal systems can be wet cooled, hybrid, or dry cooled. Wet-cooled systems use up to 14.5 ac-ft/yr per MW. Hybrid systems use dry cooling for much of the year, but switch to wet cooling when air temperature rises above approximately 100° F; hybrid systems use 2.9 ac-ft/yr per MW. Dry cooling further reduces the amount of water used, but also reduces

efficiency and output capacity, particularly in hot desert climates. Dry-cooling systems use 1.0 ac-ft/yr per MW.

The LUPA Decision Area is mostly desert with scarce water supplies. Future solar thermal systems will likely use a dry-cooled system, which minimizes water consumption and is the best available technology at this time. For purpose of this analysis, water usage for dry-cooled solar thermal systems is assumed to be 1.0 ac-ft/yr per MW. Water usage for regular cleaning and other industrial processes of solar thermal systems is assumed to use 0.5 ac-ft/yr per MW.

Geothermal power plant water use is variable and depends upon both technology and water quality. Values have been determined for dry-cooled flash and binary geothermal systems ranging from 10 gallons per megawatt hour (MWh) to 270 gallons per MWh. (Clark et al. 2011). Enhanced dry-cooled geothermal systems can consume between 290 and 720 gallons per MWh. The DRECP assumes that geothermal facilities require 5.0 acres per 50 MW of installed capacity (DRECP, Appendix F1, Table F1-1). Assuming a 70% operating capacity, those values translate into a range of 0.2 to 70 ac-ft/yr per MW. While this is the general range, specific plant designs not expected to be constructed in the desert (i.e., not re-injecting the cooling water) can push this value over 1,900 ac-ft/yr per MW (Clark et al. 2013).

Geothermal power plants in California with a generating capacity of 20 MW or greater report their water use to the California Energy Commission (CEC), which in turn reports it in the CEC's Quarterly Fuel and Energy Report. The average reported values show higher than expected water use by enhanced geothermal systems, as reported by Clark et al. 2011. Fifteen plants reporting to the CEC had an average water usage for 2010 through 2012 of 1,748 ac-ft/yr (CEC 2014). The average annual reported water use was estimated by dividing 1,748 ac-ft/yr by 56 MW (31 ac-ft/yr per MW). Similar to solar thermal plants, the water use per MW for dry-cooled geothermal plants in the desert might be about an order of magnitude less than for wet-cooled geothermal plants (3.1 ac-ft/yr per MW). For the purpose of this analysis, water usage for wet-cooled geothermal systems was assumed to be 31 ac-ft/yr per MW.

Tables in this chapter show the total acreage of renewable energy technologies within each ecoregion subarea. The tables also report the geographic distribution of estimated water use, calculated using the energy generation described in Appendix O (Methods for Megawatt Distribution), as well as the estimated water use rates just described. These acreages, together with estimated water use, are used to estimate the geographic distribution of potential impacts on groundwater, both within basins and within DRECP ecoregion subareas.

IV.6.2 Typical Impacts Common to All Action Alternatives

This section qualitatively describes the primary types of groundwater-related impacts, direct and indirect, that are common to the renewable energy project alternatives in the DRECP area.

Renewable energy projects that grade the land surface, remove vegetation, alter the conveyance and control of runoff and floods, or cover the land with impervious surfaces, alter the relationships between rainfall, runoff, infiltration, and transpiration; this potentially interferes with groundwater recharge. In general, impacts to recharge in this desert environment are not expected to be large and are dependent on things like soil characteristics, elevation, and slope. Reduction of recharge, however, can be a concern for solar projects, which occupy large areas that could increase runoff and decrease transpiration (the process of water movement through a plant and its evaporation). Geothermal facilities have a smaller facility footprint than solar, and wind facilities have an even smaller one.

Groundwater extraction and consumption by renewable energy projects can cause groundwater levels to decline (drawdown). A number of potentially significant impacts could result from the drawdown and depletion of groundwater in storage:

- Declining water levels increase the needed pumping lift in wells, and gradually cause pumping rates to decrease and eventually cease altogether.
- Declining water levels may lower groundwater gradients and reduce groundwater discharge to springs, streams, rivers, and down-gradient hydraulically connected groundwater basins.
- Lowering the groundwater table can lessen the areal extent and vigor of wetland, riparian, or other groundwater-dependent vegetation areas.
- Groundwater discharge to playas can decrease and cause wet or damp lakebeds to dry out, causing greater wind scour and dust.
- As groundwater levels and fluid pressures decline, certain types of sediments (e.g., saturated clay units) can dewater and compress. This compression of sediment beds reduces their volume and can lower land surface elevations (land subsidence). This can potentially (1) cause damage to existing structures, roads, and pipelines; (2) reverse flow in sanitary sewer systems and water delivery canals; and (3) alter the magnitude and extent of flooding. This sediment compression can also permanently reduce aquifer storage capacity.
- Some basins, especially closed basins, have localized areas of highly saline groundwater that contain terminal playas with no surface water discharge. Water-

level declines in these basins can reverse existing groundwater gradients and flow directions, causing poor-quality groundwater near the playa to flow into surrounding parts of the basin, increasing salinity in those areas.

Renewable energy projects produce or use fluids that could contaminate groundwater if introduced to soil or groundwater. Projects typically have spill prevention and response plan requirements to identify and address violations of water quality standards. The most common concerns are vehicle fuels, solvents for equipment maintenance, heat transfer fluids, brines produced by groundwater demineralization (for consumptive use), and brines produced or used as part of geothermal operations. For example, brine produced as a by-product of groundwater demineralization typically evaporates in on-site ponds and is removed as hazardous waste. Some geothermal projects store brine in on-site ponds.

IV.6.2.1 Impacts of Renewable Energy and Transmission Development

Because LUPA land designations protect ecological, historical, cultural, scenic, scientific, and recreational resources, use of or access to groundwater for renewable energy projects would likely be limited. Even though other land uses within these areas are allowed, they must still be compatible with the resources and values that the land designation is intended to protect.

IV.6.2.1.1 Impacts of Site Characterization

Ground disturbances during site characterization could potentially impact both the quantity and timing of groundwater recharge. These disturbances could be caused by grading, clearing vegetation for roads and equipment, and characterization operations. Test borings may be required for structure design, as well as to determine aquifer conditions for water-supply assessments. These impacts apply to all technologies, but are of particular concern for solar projects since they typically cover large contiguous areas.

IV.6.2.1.2 Impacts of Construction and Decommissioning

Ground disturbances during construction could potentially impact both the quantity and timing of groundwater recharge. These could be caused by grading, clearing vegetation for equipment and operations, and temporary or permanent changes that could increase the likelihood of flooding or adverse drainage effects. Projects that grade the land surface, remove vegetation, alter the conveyance and control of runoff and floods, or cover the land with impervious surfaces can alter the relationships between rainfall, runoff, infiltration, and transpiration. This is of particular concern for solar projects since they typically occupy large areas and tend to increase runoff and decrease transpiration.

Installation of water supply wells and the consumption of the water they produce as part of construction or decommissioning can affect groundwater levels and storage volumes. Water volumes used during the construction period, particularly for dust control, are typically greater than the annual amount of water required during operations. This is particularly true for photovoltaic and dry-cooled solar thermal projects, which have lower operations water demand than wet-cooled solar thermal projects.

Construction activities use fluids that could contaminate groundwater if introduced to either soil or groundwater; this would violate water quality standards and waste discharge regulations. The most common concerns are vehicle fuels and solvents for equipment maintenance.

Decommissioning activities can include efforts to abandon water supply and monitoring wells, remediate contaminated soils or groundwater, and remove structures like solar arrays, mirrors, and other equipment. Improperly abandoned wells can create a conduit between land surfaces and underlying aquifers, or, with depth, between one or more aquifers distributed vertically. This is particularly true of geothermal wells with casing that typically passes through one or more "fresh" water aquifers to deep-water zones that produce high temperature but poor groundwater quality and brines. Decommissioning itself may also consume groundwater or adversely impact the quantity and timing of groundwater recharge. Reclamation plans typically require decompaction of affected soils, which may improve surface recharge. Also typical are re-vegetation efforts that may increase evapotranspiration or return its rate to predevelopment levels.

IV.6.2.1.3 Impacts of Operations and Maintenance

Likely activities during power plant operations and maintenance include potential groundwater contamination, interference with recharge, depletion of groundwater levels and storage, and other water quality impacts. Improper handling or containment of hazardous materials could disperse contaminants to soil and impact groundwater quality. Evaporation ponds may be required as part of cooling structures, and these may leak and possibly discharge brines and other contaminants to shallow groundwater.

Groundwater consumption affects both groundwater levels and storage volumes. Solar thermal and geothermal plant operations may require substantial amounts of water for steam generation, cooling, and other industrial processes. Less water is required for cleaning facilities like solar arrays, mirrors, and other project equipment. In contrast, water demand for for wind technology would be limited to relatively small volumes for operation, maintenance, cleaning, and dust suppression.

IV.6.2.2 Impacts of the Ecological and Cultural Conservation and Recreation Designations

Impacts on groundwater resources are determined by existing conditions within the groundwater basins where the projects are located, activities on the ground surface, and other project-related activities that require groundwater. Conservation actions would have an overall positive effect on groundwater protection since renewable energy development will be restricted in conservation areas.

IV.6.3 Impact Analysis by Alternative

The following sections present impact analyses for the No Action Alternative, the Preferred Alternative, and Alternatives 1 through 4.

IV.6.3.1 No Action Alternative

IV.6.3.1.1 Impacts of Renewable Energy and Transmission Development

The No Action Alternative assumes that renewable energy and transmission development and mitigation for such projects in the DRECP area would occur on a project-by-project basis in a pattern consistent with past and ongoing renewable energy and transmission projects. The estimated renewable energy development pattern is intended to be consistent with current development patterns and technology mixes that emphasize the following:

- Solar development in six ecoregion subareas with most development in three: the Cadiz Valley and Chocolate Mountains, Kingston and Funeral Mountains, and the Providence and Bullion Mountains subareas
- Wind development in the Pinto Lucerne Valley and Eastern Slopes and West Mojave and Eastern Slopes ecoregion subareas
- Geothermal development in the Imperial Borrego Valley ecoregion subarea

Potential renewable energy development on BLM lands within the DRECP area ecoregion subareas under the No Action Alternative is shown in Table IV.6-1 (solar only, geothermal only, and total renewable energy development for all technologies, including wind and transmission). Most of the area being developed is within four ecoregion subareas: the Cadiz and Chocolate Mountains, Imperial Borrego Valley, Kingston and Funeral Mountains, and Providence and Bullion Mountains ecoregion subareas. Three ecoregion subareas, the Owens River Valley, Panamint Death Valley, and Piute Valley and Sacramento Mountains ecoregion subareas, have no new development under the No Action Alternative.

Table IV.6-1 shows the estimated total new water demand anticipated within each ecoregion subarea for the No Action Alternative. Total water use was calculated using projected MW distribution and water use factors as already described in Section IV.6.1, Approach to Impact Analysis, and in Table IV.6-1, which shows a range of water use from a minimum of 6,000 ac-ft/yr (dry-cooled solar thermal plants and wet-cooled geothermal plants) to 30,000 ac-ft/yr (wet-cooled solar thermal and geothermal plants). The most intense water use, assuming dry-cooled solar thermal development, is in the Imperial Borrego Valley ecoregion subarea at 3,000 ac-ft/yr, due to 400 acres of geothermal development; there is no geothermal development in the other ecoregion subareas. The most intense water use, assuming wet-cooled solar thermal development, is in the Cadiz Valley and Chocolate Mountains ecoregion subarea: 13,000 ac-ft/yr, due to 29,000 acres of solar development.

Table R2.6-1 (Appendix R2) reports the acreage of groundwater basins within existing protected areas: Legislatively and Legally Protected Areas (LLPAs), Military Expansion Mitigation Lands (MEMLs), and existing BLM Areas of Critical Environmental Concern (ACECs). Under the No Action Alternative, these protected areas (about 4.3 million acres) and existing BLM Conservation Designations (about 1.7 million acres) would presumably provide ongoing conservation measures; however, there would be no conservation designation established to guide where future BLM conservation designations could be established, or where reserves could be assembled to offset the environmental impacts of renewable energy and transmission development. Therefore, the conservation areas generated from renewable energy or transmission developments are based solely on mitigation requirements imposed on a project-by-project basis. Under the No Action Alternative, existing BLM land use plans within the DRECP area would continue on BLM lands. These plans allow for renewable energy development in Solar Energy Zones (SEZs) and Solar Programmatic Environmental Impact Statement (Solar PEIS) Variance Lands. These projects are approved with a project-specific LUPA, if required.

Under the No Action Alternative, renewable energy development would be on BLM-managed lands in basins hydraulically connected to adjacent areas outside the LUPA Decision Area, including the State of Nevada (Middle Amargosa Valley, Pahrump Valley, Mesquite Valley, and Ivanpah Valley basins), Arizona (Palo Verde Mesa Basin), and Mexico (the Imperial Valley and Coyote Wells basins). Groundwater level and water supply changes can therefore cross across these boundaries and impact areas outside the LUPA Decision Area and the Colorado River.

The estimated acres of groundwater basins on BLM land designations outside the DRECP area under the No Action Alternative are summarized in Table R2.6-2 (Appendix R2). Existing land designations such as Special Recreation Management Areas (SRMAs), eligible and federally designated Wild and Scenic Rivers, and ACECs would continue to protect

values and resources. These conservation actions are designed to avoid and minimize direct impacts on biological communities, so are not expected to adversely influence pre-project groundwater, water supply, and water quality conditions.

Table IV.6-1
Renewable Energy Development Area and Estimated Water Use – No Action Alternative

Ecoregion Subarea	Renewable Energy Available Development Area (acres)			MW	Water Use (AFY)	
	Solar	*Geothermal*	*Total*		*Minimum*	*Maximum*
Cadiz Valley and Chocolate Mountains	29,000	0	43,000	4,000	1,000	13,000
Imperial Borrego Valley	5,000	400	17,000	800	3,000	5,000
Kingston and Funeral Mountains	13,000	0	13,000	2,000	600	6,000
Mojave and Silurian Valley	0	0	2,000	0	0	0
Owens River Valley	0	0	0	0	0	0
Panamint Death Valley	0	0	0	0	0	0
Pinto Lucerne Valley and Eastern Slopes	500	0	4,000	100	20	200
Piute Valley and Sacramento Mountains	0	0	0	0	0	0
Providence and Bullion Mountains	10,000	0	11,000	1,000	500	4,000
West Mojave and Eastern Slopes	4,000	0	8,000	2,000	200	2,000
Total	**62,000**	**400**	**98,000**	**10,000**	**6,000**	**30,000**

Total megawatts for all technologies combined using the energy generation described in Appendix O (Methods for Megawatt Distribution).
Estimated solar thermal water use included industrial processes (0.5 ac-ft/yr/MW) and cooling (minimum estimate of 1 ac-ft/yr/MW represented by dry-cooled technology, and maximum estimate of 14.5 ac-ft/yr/MW represented by wet-cooled technology); photovoltaic water use for cleaning (0.05 ac-ft/yr/MW), and geothermal water use for cooling (assumed wet-cooled technology at 31 ac-ft/yr/MW); water use for wind assumed negligible.
Total development area is the sum of solar, geothermal, wind, and transmission project areas. Note that transmission acres include transmission only within groundwater basins.
Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Renewable energy projects can impact groundwater recharge rates, groundwater elevations, groundwater in storage, the geologic substrata through compaction and land subsidence, or cause water quality impacts from spills and brine disposal. The impacts defined are the types identified by the lead agencies for approved solar, wind, geothermal, and transmission projects.

Impact Assessment

Impact GW-1: Construction of Plan components could alter groundwater recharge.

Changes in groundwater recharge alter the quantity of groundwater available to the environment, existing users, and to proposed projects. Projects that grade the land surface, remove vegetation, alter the conveyance and control of runoff, or cover the land with impervious surfaces alter the relationships between rainfall, runoff, infiltration, and evapotranspiration. Total project acreage is an indicator of the magnitude of the land surface disturbance and potential to alter runoff, infiltration, and transpiration. As shown in Table IV.6-1, 65,000 acres of land will be disturbed under the No Action Alternative for renewable energy projects, and almost half that affected land area occurs in the Cadiz Valley and Chocolate Mountains ecoregion subarea.

Impact GW-2: Groundwater consumption lowers groundwater levels, depletes water supplies, and affects groundwater discharge.

If local groundwater is the source of water for the project, groundwater extractions will cause drawdown, at least on the local level. Total water consumption is an indicator of the potential significance of drawdown. As shown in Table IV.6-1, the greatest water use under the No Action Alternative (calculated using the projected megawatt distribution and water use factors described in Section IV.6.1, Approach to Impact Analysis) is within the Imperial Borrego Valley (3,000 ac-ft/yr) and Cadiz Valley and Chocolate Mountains subareas (13,000 ac-ft/yr), depending upon which solar thermal cooling method is assumed. The Kingston and Funeral Mountains and Providence and Bullion Mountains ecoregion subareas also have relatively high water use, primarily from solar technology. Declining groundwater levels can cause the following:

- The energy required to extract the groundwater increases and, gradually over time, the well production rates decrease.
- The extent and vigor of wetland, riparian, or other groundwater-dependent vegetation areas can be at risk when the water table declines beneath these areas and the discharge decreases.
- Groundwater discharge declines to dependent springs, streams, rivers, and playas when the water table declines.
- The surfaces of some playas receive water from groundwater discharge; as discharge declines the lakebed dries, increasing wind scour and dust.
- Some groundwater basins receive inflow from adjacent basins, and these basins can be located either within or outside the DRECP area. This flow can occur within saturated alluvium that hydraulically connects adjacent basins, groundwater leaking

across an adjoining fault between basins, or as deep groundwater flow within a regionally extensive formation beneath relatively shallow alluvial basins. If groundwater is extracted from storage in the up-gradient/tributary basin, this may limit outflow into the down-gradient basin and diminish the resource.

Impact GW-3: Groundwater consumption could cause land subsidence and permanently decrease storage capacity.

As shown in Table IV.6-1, new renewable energy water use under the No Action Alternative calculated the projected megawatt distribution and water use factors, as described in Section IV.6.1, Approach to Impact Analysis. These could range from 6,000 to 30,000 ac-ft/yr. Most of that water use is attributed to solar development in the Cadiz Valley and Chocolate Mountains ecoregion subarea, or solar and geothermal development in the Imperial Borrego Valley ecoregion subarea. When groundwater is extracted and water levels decline over time, the pressure of water in pores between mineral grains in the alluvial sediments decreases and can cause certain types of saturated geological materials (e.g., clays) to dewater and compress. Similarly, when geothermal wells extract fluids from geologic strata that are typically thousands of feet below the water supply wells, these deep fluid withdrawals lower the fluid pressure in deep sediment beds and can cause them to compress. This compression reduces the volume of the sediment beds and lowers land surface elevations, which can damage existing structures, roads, and pipelines; reverse flow in sanitary sewer systems and water delivery canals; and alter the magnitude and extent of flooding along creeks, lakes, and storm management structures. This compression of materials also permanently reduces storage capacity. Total water consumption and the magnitude of development are indicators of the potential significance of impacts from subsidence.

Impact GW-4: Groundwater consumption could cause existing poor-quality groundwater to migrate.

As shown in Table IV.6-1, estimated new renewable energy water use under the No Action Alternative could range from 6,000 to 30,000 ac-ft/yr. Most of the water use is attributed to solar development in the Cadiz Valley and Chocolate Mountains ecoregion subarea or solar and geothermal development in the Imperial Borrego Valley ecoregion subarea. Some basins have localized areas of highly saline groundwater, particularly basins with terminal playas and no surface water outflow. Groundwater extraction and water level drawdown, over time, can change the existing groundwater gradient, causing poor-quality groundwater near the playa to flow into surrounding parts of the basin, increasing salinity in the affected areas. Total groundwater consumption, certain geological settings, and the magnitude and proximity of development to the highly saline groundwater areas are all indicators of significant drawdown potential, gradient changes, and impacts on groundwater quality.

Impact GW-5: Injection of water for geothermal steam generation could contaminate potable water supplies.

As shown in Table IV.6-1, 400 acres of geothermal development occur in the No Action Alternative in the Imperial Borrego Valley ecoregion subarea. Saline water re-injected during geothermal energy project operations can leak into relatively shallow water supply aquifers if an injection well casing fails. The magnitude of geothermal development in a basin is an indicator of its potential impacts on groundwater quality.

Impact GW-6: Chemical spills or brine disposal could contaminate groundwater.

Renewable energy projects produce or use hazardous fluids. In some circumstances, those fluids would influence groundwater quality if they leaked into an aquifer. The most common fluids are vehicle fuels, solvents for equipment maintenance, heat transfer fluids, brines produced by demineralization, and brines produced from geothermal extraction wells. Typically, reject brine produced by demineralizing groundwater evaporates in on-site ponds and any residue is disposed of properly. Geothermal projects also commonly store excess brine, produced by wells or cooling towers, in ponds. If the ponds leak or overflow, groundwater quality could be impacted. Additionally, improper handling and containment of hazardous materials (with transmission facility electrical equipment located inside and outside the DRECP area) could disperse contaminants to soil or groundwater.

The total area of renewable energy and transmission development is an indicator of potential groundwater quality impacts from chemical spills or brine disposal. As shown in Table IV.6-1, 65,000 acres of land would be developed under the No Action Alternative for renewable energy projects, increasing the potential for contamination in basins

Impact Reduction Strategies

Design Features of the Solar PEIS

The Solar (PEIS) includes Design Features (Appendix W) that would reduce the environmental impacts of solar energy development, including measures to control runoff (defined in WR1-1), measures to quantify groundwater aquifers and sustainable yield (defined in WR1-2), measures to secure a reliable and legally available water supply (defined in WR1-3, and impact reduction measures (defined in WR2-1, WR3-1, and WR4-1 for construction, operation, and decommissioning, respectively). These measures would apply only in BLM SEZs and Solar PEIS variance lands.

Laws and Regulations

Existing laws and regulations would reduce the impacts of renewable energy development projects in the absence of the Proposed LUPA. Relevant regulations are presented in the Regulatory Setting in Volume III. The requirements of relevant regulations would reduce impacts through the following mechanisms:

- Federal regulations (e.g., the Clean Water Act, Resource Conservation Recovery Act, Safe Drinking Water Act, and EPA Sole Source Aquifer Protection Program), state regulations (e.g., the Porter-Cologne Act, State Water Resources Control Board Anti-degradation Policy, and compliance with Waste Discharge Requirements set by the Water Boards), and ordinances administered by the various counties, municipalities, and water and wastewater agencies would limit groundwater quality impacts. Underground Injection Control permits, designed to prevent contamination and protect groundwater and drinking water sources from wastewater injection, would limit impacts from brine injection wells.
- The "Law of the River" for Colorado River Water accounting, the Wild & Scenic Rivers Act, and Watermasters in adjudicated groundwater basins would limit impacts to groundwater storage depletion. Urban Water Management Plans and Groundwater Management Plans also regulate groundwater uses.

Typical Mitigation Measures

Mitigation measures adopted for approved projects are assumed to be the same as those applied in the No Action Alternative. These mitigation measures can include:

- Groundwater Level, Quality, and Subsidence Monitoring, Mitigation, and Reporting Plans. These plans provide detailed methodologies for monitoring background and site conditions. The primary monitoring objective is to establish pre-project groundwater levels, water quality, and land surface elevations and trends in order to compare those factors with observed changes from project construction and operations. These plans can include Mitigation Action Plans to identify thresholds of significance and actions taken if thresholds are reached.
- Water Supply Assessments. These plans determine the groundwater available for project use. The plans include groundwater budget assessments based on numerical groundwater flow models, statistical analyses, and other hydrologic assessments, to determine available groundwater and to estimate potential impacts. The plans can include Drought Water Management Programs and Water Conservation Education Programs that describe how water will be managed and used during droughts. These plans can require mitigation for groundwater use by reducing pre-existing

uses in the basin (e.g., increased conservation or transfers of formally permitted water uses), reducing project use (e.g., requiring the best available technology to minimize water use, like dry cooling technology), or providing an alternative supply (e.g., imported water, recycled water). Measures to improve groundwater recharge under project conditions can include, for example, the installation of pervious groundcover to ensure maximum percolation of rainfall, and on-site drainage improvements that direct drainage from impervious surfaces to a common pervious drainage basin to maximize groundwater basin recharge.

- Installing metering devices to measure and report water use, and setting prescribed limits on groundwater use during construction and operations. These water-use restrictions can include pumping reductions when impact thresholds are reached.
- Compensating well owners impacted by project groundwater use, including compensation for increased power costs, well modifications and repair, and well replacement.
- Monitoring groundwater-dependent vegetation, springs, and wildlife within areas potentially affected by groundwater pumping.
- Monitoring brine ponds to prevent leaks and groundwater quality impacts and monitoring emergency plans for accidental geothermal brine or heat transfer fluid spillage and subsequent treatment.

IV.6.3.1.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

The No Action Alternative has no new conservation or recreation designations, but without approval of an action alternative, there would be continued protection of existing LLPAs like wilderness areas. In addition, under the No Action Alternative, renewable energy projects would continue to be evaluated and approved with project-specific mitigation requirements.

Renewable energy development is excluded from existing LLPAs, reducing potential impacts on groundwater. Impacts on existing protected lands under the No Action Alternative could result from adjacent renewable energy development. Potential impacts would be influenced by the size of the developed area, the water required by the development, and the characteristics of the basins where the projects are developed.

IV.6.3.1.3 Impacts of Transmission Outside the DRECP Area

Outside the DRECP area, additional transmission lines would be needed to deliver generated renewable electricity to load centers (areas of high demand). It is assumed that new transmission lines outside the DRECP area would use existing transmission corridors between the DRECP area and existing substations in the more populated coastal areas of

the state. The load centers outside the DRECP area through which new transmission lines might be constructed are San Diego, Los Angeles, North Palm Springs–Riverside, and Central Valley. These areas are described in Chapter III.6, Groundwater, Water Supply, and Water Quality, Section III.6.9.

Impact GW-1: Construction of Plan components could alter groundwater recharge.

Transmission lines would not alter groundwater recharge. Transmission towers have small footprints and their footings introduce minimal impervious surface. Access roads would be either existing paved roads or unpaved roads and would not alter the amount of impervious surface in an area. Where the terrain requires leveling, runoff is controlled by implementation of erosion control and site restoration, and the runoff would not be diverted in a way that would not allow recharge.

Impact GW-2: Groundwater consumption lowers groundwater levels, depletes water supplies, and affects groundwater quality and groundwater discharge.

The only substantial potential use of water during transmission line construction would be for dust control. The usual practice is that construction contractors obtain water for this purpose from a municipal source with adequate supplies and are prohibited from pumping groundwater.

Other groundwater, water supply, and water quality impacts identified for renewable energy development follow:

- Impact GW-3: Groundwater consumption could cause land subsidence and permanently decrease storage capacity.
- Impact GW-4: Groundwater consumption could cause existing poor-quality groundwater to migrate.
- Impact GW-5: Injection of water for geothermal steam generation could contaminate potable water supplies.
- Impact GW-6: Chemical spills or brine disposal could contaminate groundwater.

These impacts would not occur as a result of transmission projects outside the DRECP area. There would be no groundwater pumping or use, and no water injection; the risk of chemical spills would be solely from vehicle maintenance and fueling. If these occurred they would be localized and requirements imposed on the project would require immediate clean-up and disposal of any contaminated soil.

IV.6.3.2 Preferred Alternative

IV.6.3.2.1 Impacts of Renewable Energy and Transmission

The Preferred Alternative balances biological and nonbiological resource conflicts and renewable energy goals. DFAs are areas where renewable energy and transmission projects are permitted on BLM lands under the Proposed LUPA. They provide moderate development flexibility, have moderate resource conflicts (biological and nonbiological), and are aligned with existing and planned transmission networks. Transmission development may also occur outside the DFAs. The estimated renewable energy development patterns are:

- Solar development throughout the DRECP area, but concentrated in the Cadiz Valley and Chocolate Mountains, Imperial Borrego Valley, and West Mojave and Eastern Slopes ecoregion subareas
- Wind development distributed mostly in the Cadiz Valley and Chocolate Mountains ecoregion subarea
- Geothermal development in the Imperial Borrego Valley and Owen's River Valley ecoregion subareas

Impact Assessment

Potential renewable energy development on BLM lands within DRECP ecoregion subareas under the Preferred Alternative is shown in Table IV.6-2 (solar only, geothermal only, and total renewable energy development for all technologies, including wind and transmission). Development would occur in 24 groundwater basins within these subareas. Most (90%) of the developed area is within four ecoregion subareas: Cadiz Valley and Chocolate Mountains, Imperial Borrego Valley, Pinto Lucerne Valley and Eastern Slopes, and West Mojave and Eastern Slopes ecoregion subareas. Geothermal projects would be in the Imperial Borrego Valley and Owens River Valley ecoregion subareas; 86% of geothermal development is in the Imperial Borrego Valley. The Piute Valley and Sacramento Mountains subarea has no new development under the Preferred Alternative.

Table IV.6-2 shows the estimated total of new water use by solar and geothermal projects within each ecoregion subarea for the Preferred Alternative. Total water use was calculated using the projected megawatt distribution and water use factors as described in Section IV.6.1, Approach to Impact Analysis. The water use shown in Table IV.6-2 assumes that dry-cooled solar thermal technology will be used because of water scarcity in the desert basins. The estimated total water use is 44,000 ac-ft/yr, and in the subareas with proposed new development ranges from a minimum of 10 ac-ft/yr (Kingston and Funeral Mountains ecoregion subarea) to 37,000 ac-ft/yr (Imperial Borrego Valley ecoregion subarea). Eighty-

four-percent of the estimated water use under the Preferred Alternative is in the Imperial Borrego Valley ecoregion subarea because of 6,000 acres of geothermal projects and 9,000 acres of solar projects. Wet-cooled geothermal projects account for over 42,000 ac-ft/yr of total water used under the Preferred Alternative.

Under the Preferred Alternative, renewable energy development can be located in a number of groundwater basins identified as in overdraft or as stressed. Figure IV.6-1 maps the distribution of estimated water use by DFA and groundwater basins in overdraft, and Figure IV.6-2 maps the water use by DFA and groundwater basins in overdraft or stressed conditions. Under the Preferred Alternative, development could occur in 15 overdraft and stressed groundwater basins, and the increased groundwater use in these sensitive basins can adversely affect water supplies and exacerbate impacts associated with overdraft conditions and declining groundwater levels.

Under the Preferred Alternative, there would be renewable energy development in basins hydraulically connected to adjacent areas located outside the DRECP area. (See Figure IV.6-1 for the locations and distribution of development areas.) Renewable energy projects are planned in groundwater basins connected to areas within the State of Nevada (the Mesquite Valley basin, located in the Kingston and Funeral Mountains ecoregion subarea), Mexico (the Imperial Valley Basin, located in the Imperial Borrego Valley ecoregion subarea), and Arizona (the Palo Verde Mesa Basin located in the Cadiz Valley and Chocolate Mountain ecoregion subarea). As a result, groundwater level and water supply changes can extend across these boundaries and impact areas outside both the DRECP area and the Colorado River.

Table IV.6-2
Renewable Energy Development Area and Estimated Water Use: Preferred Alternative

Ecoregion Subarea	Renewable Energy Development Focus Area (acres)			MW	Water Use (AFY)
	Solar	*Geothermal*	*Total*		
Cadiz Valley and Chocolate Mountains	16,000	0	22,000	3,000	800
Imperial Borrego Valley	9,000	6,000	20,000	2,000	37,000
Kingston and Funeral Mountains	100	0	100	20	10
Mojave and Silurian Valley	300	0	3,000	50	20
Owens River Valley	500	1,000	1,000	300	6,000
Panamint Death Valley	2,000	0	2,000	300	100
Pinto Lucerne Valley and Eastern Slopes	2,000	0	5,000	500	80
Piute Valley and Sacramento Mountains	0	0	0	0	0
Providence and Bullion Mountains	600	0	800	100	30

Table IV.6-2
Renewable Energy Development Area and Estimated Water Use: Preferred Alternative

Ecoregion Subarea	Renewable Energy Development Focus Area (acres)			MW	Water Use (AFY)
	Solar	*Geothermal*	*Total*		
West Mojave and Eastern Slopes	8,000	0	16,000	1,000	400
Total	**38,000**	**7,000**	**70,000**	**8,000**	**44,000**

Total megawatts for all technologies combined using the energy generation described in Appendix O (Methods for Megawatt Distribution).
Estimated solar thermal water use included industrial processes (0.5 ac-ft/yr/MW) and cooling (minimum estimate of 1 ac-ft/yr/MW represented by dry-cooled technology); photovoltaic water use for cleaning (0.05 ac-ft/yr/MW), and geothermal water use for cooling (assumed wet-cooled technology at 31 ac-ft/yr/MW); water use for wind assumed negligible.
Total development area is the sum of solar, geothermal, wind, and transmission project areas. Note that transmission acres include transmission only within groundwater basins.
Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

The Proposed LUPA alternative designates new NLCS lands, new ACECs and wildlife allocations. It also expands and reduces existing ACECs, designates new SRMAs and expands and reduces existing SRMAs, and creates buffer corridors along National Scenic and Historic Trails. The Proposed LUPA would also replace the multiple-use classes (MUCs) and establishes Visual Resource Management (VRM) classes in the CDCA. More than 5.6 million acres are assumed allocated in LUPA land designations under the Preferred Alternative. Because the BLM LUPA land designations protect ecological, historic, cultural, scenic, scientific, and recreation resources and values, the use of or access to groundwater resources to meet renewable energy project water requirements would likely be limited. Groundwater-related CMAs apply and are protective of the resource, and the CMAs are the same for all action alternatives.

Under the proposed BLM LUPA, the only changes outside the DRECP area would be to National Landscape Conservation System (NLCS) lands, ACECs, National Scenic and Historic Trails management corridors, Visual Resource Management (VRM) Classes, and to new land allocations to replace Multiple Use Classes on CDCA lands. The estimated acreage of groundwater basins in BLM LUPA lands located outside the DRECP area under the Preferred Alternative is summarized in Table R2.6-3 (Appendix R2). Because the BLM LUPA land designations outside the DRECP area protect ecological, historic, cultural, scenic, scientific, and recreation resources and values, the use of or access to groundwater resources to meet renewable energy project water requirements would be limited.

Impacts on groundwater resulting from renewable energy development under the Preferred Alternative follow.

Impact GW-1: Construction of Plan components could alter groundwater recharge.

Impacts on groundwater recharge from land disturbance under the Preferred Alternative would be similar to those shown in Section IV.6.3.1.1. The Preferred Alternative potentially affects recharge on 70,000 acres.

Impact GW-2: Groundwater consumption lowers groundwater levels, depletes water supplies, and affects groundwater quality and groundwater discharge.

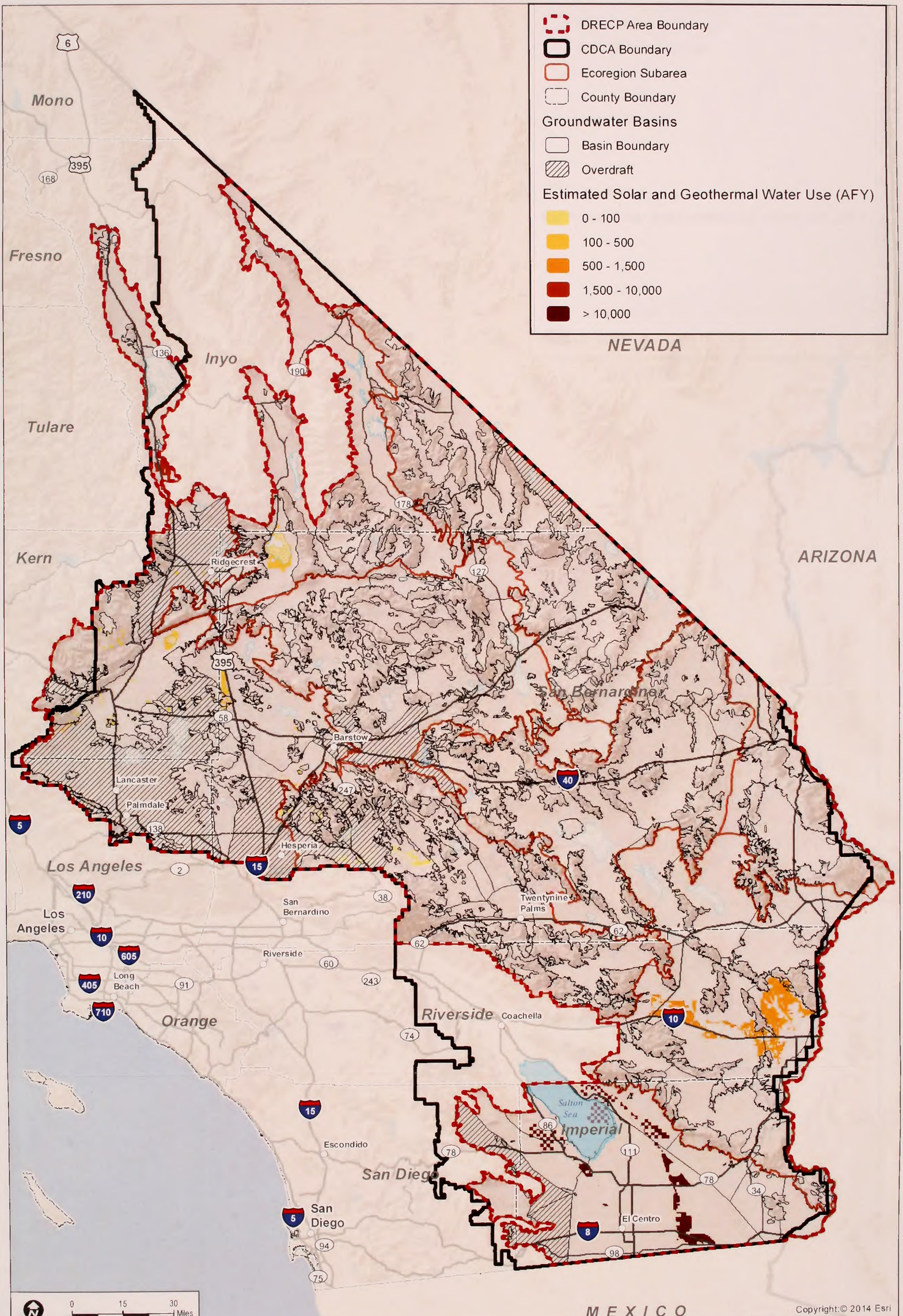
Impacts on groundwater levels would be similar to those shown in Section IV.6.3.1.1. The greatest potential water use is within the Imperial Borrego Valley (37,000 ac-ft/yr) and Owens River Valley (6,000 ac-ft/yr), mostly for geothermal technology (7,000 acres) and solar technology (9,500 acres). The majority of the remaining water use for the Preferred Alternative is for solar technology located in the Cadiz Valley and Chocolate Mountains, and West Mojave and Eastern Slopes ecoregion subareas. Fifteen basins within these ecoregion subareas are either in overdraft or characterized as stressed (Figure IV.6-2), and groundwater use for proposed renewable energy projects will likely exacerbate depletion of the water supply and the magnitude and scope of adverse impacts.

Impact GW-3: Groundwater consumption could cause land subsidence and permanently decrease storage capacity.

Land subsidence would cause impacts similar to those shown in Section IV.6.3.1.1. As shown in Table IV.6-2, renewable energy water use under the Preferred Alternative can be as great as 44,000 ac-ft/yr, with most of the water use attributed to geothermal and solar development in the Imperial Borrego Valley (37,000 ac-ft/yr) and Owens River Valley (6,000 ac-ft/yr).

Impact GW-4: Groundwater consumption could cause existing poor-quality groundwater to migrate.

Impacts from the potential migration of poor-quality groundwater would be similar to those shown in Section IV.6.3.1.1. The large amount of renewable energy development could affect groundwater quality.

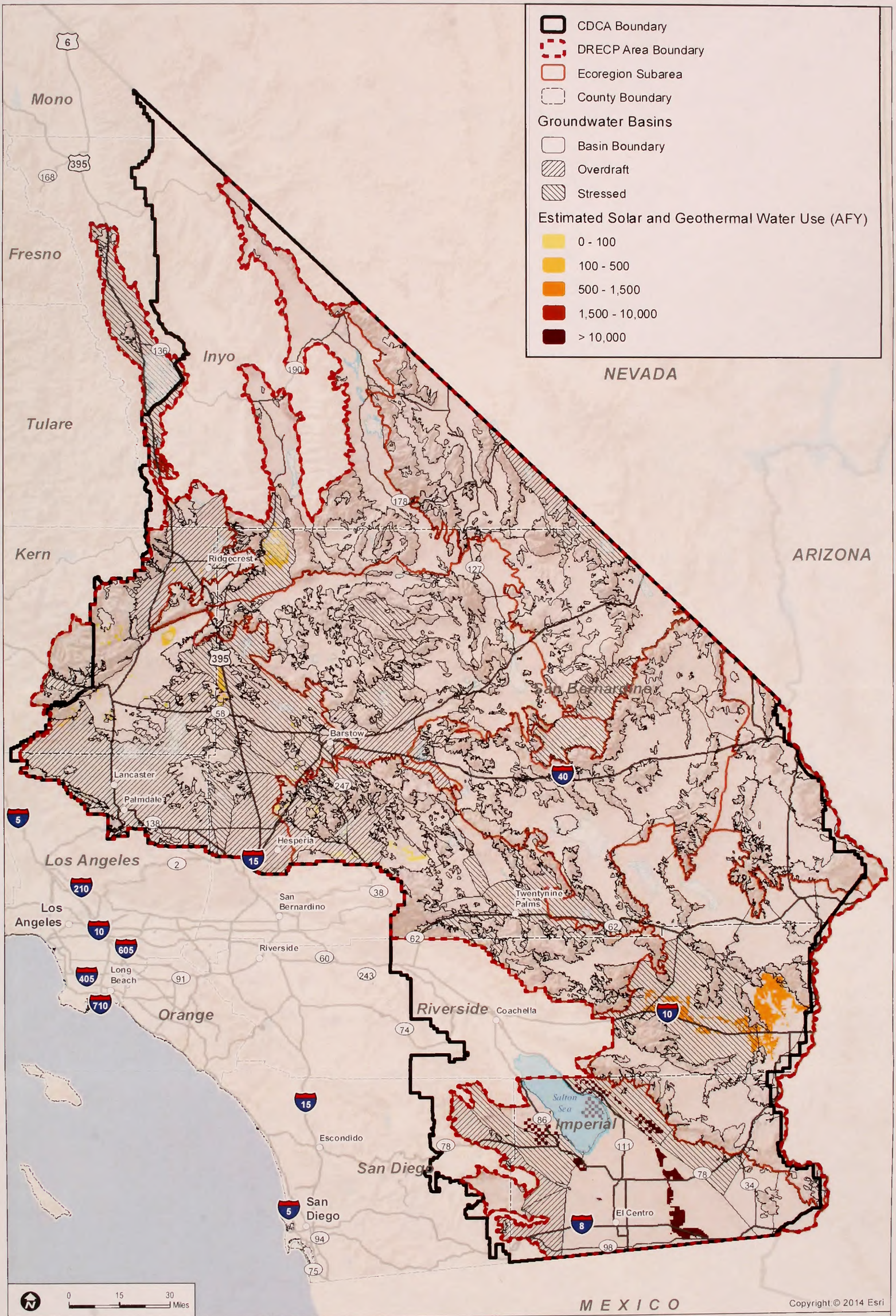


Sources: ESRI (2014); California Department of Water Resources (2003)

FIGURE IV.6-1

Planned Development Areas, Estimated Solar and Geothermal Water Use, and Overdraft Groundwater Basins - Preferred Alternative

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Sources: ESRI (2014); California Department of Water Resources (2003)

FIGURE IV.6-2

Planned Development Areas, Estimated Solar and Geothermal Water Use, and Overdraft and Stressed Groundwater Basins - Preferred Alternative

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Impact GW-5: Injection of water for geothermal steam generation could contaminate potable water supplies.

The potential for impacts from injection of saline water from geothermal resource water would be as described in Section IV.6.3.1.1. Geothermal development increases the potential for contamination, particularly in the Imperial Borrego Valley ecoregion subarea where most of the geothermal development would be built.

Impact GW-6: Chemical spills or brine disposal could contaminate groundwater.

Groundwater contamination from chemical spills or brine disposal would be as described in Section VI.6.3.1.1.

Impacts on Variance Process Lands

Variance Process Lands are neither reserve lands nor DFAs. They are a subset of the variance lands identified in the Solar PEIS Record of Decision (ROD) and additional lands that, based on current information, have moderate to low ecological value and ambiguous value for renewable energy. If renewable energy development occurs on Variance Process Lands, a LUPA would not be required, so the environmental review process would be simpler than if the location were left undesignated.

Variance Process Lands for each alternative are shown in Chapter IV.1, Table IV.1-2, and in Volume II, Chapter II.3, Figure II.3-1, for the Preferred Alternative. Development of Variance Process Lands would have similar air quality effects as described under Impacts GW-1 through GW-6.

Impact Reduction Strategies

Design Features of the Solar PEIS

The Solar PEIS includes Design Features (Appendix W) that would reduce the impacts of solar energy development, including: measures to control runoff (defined in WR1-1), measures to quantify groundwater aquifers and sustainable yield (defined in WR1-2), measures to secure a reliable and legally available water supply (defined in WR1-3), and impact reduction measures (defined in WR2-1, WR3-1, and WR4-1 for construction, operation, and decommissioning, respectively). These measures would apply only in BLM SEZs and Solar PEIS variance lands.

Conservation and Management Actions

The conservation strategy for the Preferred Alternative (presented in Volume II, Section II.3.4) defines specific actions that would reduce the impacts of this alternative. The conservation strategy includes a definition of the conservation designations and specific Conservation and Management Actions (CMAs) for the Preferred Alternative. The CMAs require a Water Supply Assessment for all projects. The purpose of the Water Supply Assessment is to determine whether project groundwater use causes water supply or environmental impacts on the groundwater basins where the development occurs. The assessment evaluates existing extractions, water rights, and water management plans, and requires site- and basin-specific hydrogeological information.

The CMAs require Water Monitoring and Reporting Plans and Mitigation Action Plans. These plans identify project-related impacts on water quantity and quality affecting other approved domestic or industrial groundwater uses and the environmental requirements for groundwater (e.g., surface water bodies, surface outflow, and riparian or phreatic vegetation), including the period of aquifer recovery after project decommissioning. The plans also detail mitigation measures required because of project-related impacts on groundwater. These measures can include changing pumping rates and the volume or timing of withdrawals, coordinating and scheduling groundwater pumping activities in conjunction with other users in the basin, ceasing pumping and acquiring project water from outside the basin, and replenishing groundwater resources over a reasonably short time frame.

The CMAs are summarized here and presented in detail in Volume II, Section II.3.4.2. For any project that proposes to utilize groundwater resources, the following stipulated CMAs shall apply, regardless of project location:

- **LUPA-SW-18** A project's groundwater extraction shall not contribute to exceeding the estimated perennial yield for the basin in which the extraction is taking place. Exceeding a basin's perennial yield can have undesirable effects on the basin's physical and chemical condition. It is further quantified arithmetically in CMA LUPA-SW-24.
- **LUPA-SW-19** Water extracted or consumptively used for the construction, operation, maintenance, or remediation of the project shall be solely for the beneficial use of the project or its associated mitigation and remediation measures. This assures that water is not used for purposes not directly related to the project.
- **LUPA-SW-20** Water flow meters shall be installed on all extraction wells permitted by BLM. This will provide information needed to develop a detailed water budget for the project area.

- **LUPA-SW-21** If possible, all unavoidable impacts on surface waters shall be mitigated to ensure no net negative impact to the surface water from project implementation.
- **LUPA-SW-22** Consideration shall be given to design alternatives that maintain the existing hydrology of the site or redirect excess flows created by hardscapes and reduced permeability from surface waters to areas where they will dissipate by percolation into the landscape.
- **LUPA-SW-23** Degradation of water quality will be minimized by avoiding all hydrologic alterations that could reduce water quality for all applicable beneficial uses associated with the project.
- **LUPA-SW-24** A Water (Groundwater) Supply Assessment shall be prepared prior to project certification or authorization. The purpose of the Water Supply Assessment is to determine whether over-use or overdraft conditions exist within the project basin(s), and whether the project creates or exacerbates these conditions. This analysis shall be in the form of a numerical groundwater model. The model extent shall encompass the groundwater basin(s) where a project would be built, and any groundwater-dependent resources within the groundwater basin(s).
- **LUPA-SW-25** Groundwater Monitoring and Reporting Plans, and Mitigation Action Plans (GMMP) shall be prepared to verify the Water Supply Assessment and adaptively manage water use as part of project operations.
- **LUPA-SW-26** One or more "trigger points," or specified groundwater elevations in specific wells or surface water bodies, shall be established to identify if additional mitigation measures will be imposed.
- **LUPA-SW-27** Groundwater pumping mitigation shall be imposed if groundwater monitoring data indicate impacts on water-dependent resources that exceed those anticipated and otherwise mitigated for in the NEPA analysis and ROD, even if the basin's perennial yield is not exceeded.
- **LUPA-SW-28** Water-conservation measures shall be required in basins where current groundwater demand is high and has the potential for demand to rise above the estimated perennial yield. These measures will assure that groundwater withdrawals do not exceed the perennial yield.
- **LUPA-SW-29** Groundwater extractions from adjudicated basins, such as the Lower, Middle, and Upper Mojave River basins, may be subject to additional restrictions imposed by the designated authority to prevent groundwater extractions in the basin from exceeding the adjudicated allotment.

- **LUPA-SW-30** Groundwater pumping mitigation may also be imposed if monitoring data indicate impacts on groundwater or groundwater-dependent habitats outside the DRECP area to prevent impacts from affecting adjacent groundwater basins.
- **LUPA-SW-31** Activities shall comply with local requirements for any permanent or temporary domestic water use and wastewater treatment.
- **LUPA-SW-32** The siting, construction, operation, maintenance, remediation, and abandonment of all wells shall conform to specifications contained in Department of Water Resources (DWR) Bulletins #74-81 and #74-90 and their updates.
- **LUPA-SW-33** The Colorado River accounting surface method shall be the accepted method of determining whether project-related pumping may draw water from the Colorado River. The project applicant will be required to offset or otherwise mitigate the volume of water causing drawdown below the accounting surface.

Soil, Water, and Water-Dependent Resources CMAs Restricted to Specific Areas on BLM Lands

- **LUPA-SW-34 Stipulations for groundwater development in the proximity of Devils Hole:** Any development scenario within 25 miles of Devils Hole shall include a plan to achieve *zero-net* or *net-reduced* groundwater pumping to reduce the risk of adversely affecting senior federal reserved water rights, the designated critical habitat of the endangered Devils Hole pupfish, and the free-flowing requirements of the Wild and Scenic Amargosa River.
- **LUPA-SW-35 Stipulations for groundwater development in the Calvada Springs/ South Pahrump Valley DFA:** Activities in this DFA shall be required to acquire one or more MWRs in the Pahrump Valley Hydrographic Basin in Nevada.
- **LUPA-SW-36 Stipulations for development in the vicinity of Death Valley National Park, Joshua Tree National Park, or Mojave National Preserve:** The National Environmental Policy Act (NEPA) requirements for activities involving groundwater extraction in the vicinity of Death Valley National Park, Joshua Tree National Park, or the Mojave National Preserve shall analyze and address any potential impacts of groundwater extraction on these parks and preserve. This analysis will identify potential impacts on the water balances and physical conditions of groundwater basins, springs, perennial streams, intermittent streams, and ephemeral drainages within these parks and preserves.

Laws and Regulations

Existing laws and regulations would further reduce the impacts of renewable energy development projects constructed subsequent to the Proposed LUPA. Relevant regulations are presented in the Regulatory Setting in Volume III, and summarized in Section IV.6.3.1.1.

IV.6.3.2.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

The estimated acres of groundwater basins in Ecological and Cultural Conservation and Recreation Designation lands are summarized in Table R2.6-4 (Appendix R2). These lands include existing protected areas (LLPAs and Military Expansion Mitigation Lands [MEMLs]), plus the Preferred Alternative existing and proposed BLM conservation lands (NLCS, ACECs, and wildlife allocations). No renewable energy development is allowed on almost 8.1 million acres of these protected areas, nor is the use of or access to underlying groundwater. This includes more than 3.5 million acres within 37 groundwater basins identified as either in overdraft or stressed. No adverse impacts are expected to groundwater resources in these basins because of these land designations, and restricting renewable energy development from these areas would protect and preserve groundwater.

IV.6.3.2.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside the DRECP area on groundwater, water supply, and water quality would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.6.3.1.3, Impacts of Transmission Outside the DRECP Area, in the No Action Alternative.

IV.6.3.2.4 Comparison of the Preferred Alternative with No Action Alternative

Based on technology mix assumptions, the Preferred Alternative includes proposed development of 28,000 acres less area than in the No Action Alternative (70,000 acres versus 98,000 acres, respectively). This decreased level of land disturbance associated with development decreases the potential to alter groundwater recharge. Under the Preferred Alternative, the potential for chemical spills and groundwater quality impacts is less because the developed area is smaller. However, existing regulations and CMAs (Preferred Alternative) reduce these potential impacts in both alternatives.

In the Preferred Alternative, it is assumed that there would be 17 times more acreage for geothermal energy projects than in the No Action Alternative, increasing potential adverse impacts from water consumption, subsidence, and groundwater contamination. However, with existing regulations, implementation of CMAs, and additional measures required for renewable energy projects, these impacts would be mitigated.

Renewable energy projects in the Preferred Alternative are estimated to use seven times more water than under the No Action Alternative, primarily due to greater geothermal development under the Preferred Alternative.

Geographic Distinctions

Unlike in the Preferred Alternative, in the No Action Alternative renewable energy development is assumed in the Providence and Bullion Mountains ecoregion subarea. Under existing conditions, more than 99% of the basin area within this ecoregion subarea is undisturbed and has no existing renewable energy development.

Solar and geothermal technologies account for most renewable energy-related water use, so the locations of these projects are important to consider. The No Action Alternative assumes over 62,000 acres of solar and geothermal development in 25 of the 39 overdraft or stressed basins in other portions of the DRECP area; the Preferred Alternative assumes 45,000 acres of development in only 14 of the same 39 basins (Figure IV.6-2). The Preferred Alternative therefore has more concentrated development in a fewer number of overdraft and stressed basins.

Under the Preferred Alternative, renewable energy projects could occur in groundwater basins connected to areas adjacent to the DRECP area. These areas are located in the State of Nevada (the Pahrump Valley Basin located in the Kingston and Funeral Mountains ecoregion subarea), Mexico (the Imperial Valley Basin, located in the Imperial Borrego Valley ecoregion subarea), and Arizona (Palo Verde Valley Basin, located in the Cadiz Valley and Chocolate Mountain ecoregion subarea). Groundwater level and water supply changes can therefore extend across these boundaries and impact areas outside the DRECP area including the Colorado River. For example, the Pahrump Valley Basin is in overdraft (Figure IV.6-1) due to development in Nevada. Groundwater flow in the deep limestone formations occurs from the Pahrump Valley and Spring Mountains in Nevada to the Middle Amargosa Valley Basin. Past pumping in the Nevada portion of the basin may have reduced flow from springs in the Middle Amargosa Valley Basin. However, the mechanism of hydraulic connection between groundwater in the alluvial basin and deep groundwater in the regional carbonate aquifer system (and their relative contributions to Amargosa River flows and spring flows) is complicated and poorly understood. Development within the Pahrump Valley Basin must therefore consider these possible connections when identifying and quantifying potential impacts.

In comparison with the Preferred Alternative, the No Action Alternative could affect more areas located outside the LUPA Decision Area. For example, Table IV.6-1 shows that the No Action Alternative has more development in the Kingston and Funeral Mountains ecoregion subarea located adjacent to the State of Nevada. Groundwater in deep limestone formations

beneath these areas can flow to springs along the east side of the Death Valley Basin (e.g., the Greenwater Valley and Middle Amargosa Valley basins). Development under the Preferred Alternative is less or nonexistent in these sensitive basins and provides an overall environmental benefit relative to the No Action Alternative.

IV.6.3.3 Alternative 1

IV.6.3.3.1 Impacts of Renewable Energy and Transmission

Alternative 1 integrates renewable energy components, BLM LUPA components, and the conservation components of the DRECP Preferred Alternative. Alternative 1 includes geographically confined DFAs with development of solar, wind, and geothermal technologies on BLM lands. It also includes Ecological and Cultural Conservation and Recreation Designations. Transmission development and operation would be acceptable both inside and outside the DFAs. The estimated renewable energy development pattern emphasizes the following:

- Solar development in the Cadiz Valley and Chocolate Mountains, Imperial Borrego Valley, Owens River Valley, Pinto Lucerne Valley and Eastern Slopes, and West Mojave and Eastern Slopes ecoregion subareas.
- Wind development in the Cadiz Valley and Chocolate Mountains, Pinto Lucerne Valley and Eastern Slopes ecoregion subareas.
- Geothermal development in the Imperial Borrego Valley ecoregion subarea.

Impact Assessment

Potential renewable energy development area on BLM lands within the DRECP area under Alternative 1 is shown in Table IV.6-3 (solar only, geothermal only, and total renewable energy development for all technologies, including wind and transmission). Development would occur in 24 groundwater basins. Most of the developed area (81%) is within four ecoregion subareas: Cadiz Valley and Chocolate Mountains, Imperial Borrego Valley, Pinto Lucerne Valley and Eastern Slopes, and West Mojave and Eastern Slopes. Geothermal projects are only in the Imperial Borrego Valley ecoregion subarea. Three ecoregion subareas (Kingston and Funeral Mountains, Panamint Death Valley, and Piute Valley and Sacramento Mountains) have no planned development under Alternative 1.

Table IV.6-3 shows the estimated total new water use by solar and geothermal projects within each ecoregion subarea. Total water use was calculated using the projected megawatt distribution and water use factors described in Section IV.6.1, Approach to Impact Analysis. The water use shown in Table IV.6-2 was estimated assuming that dry-cooled solar thermal technology will be used because of the scarce water resources in the

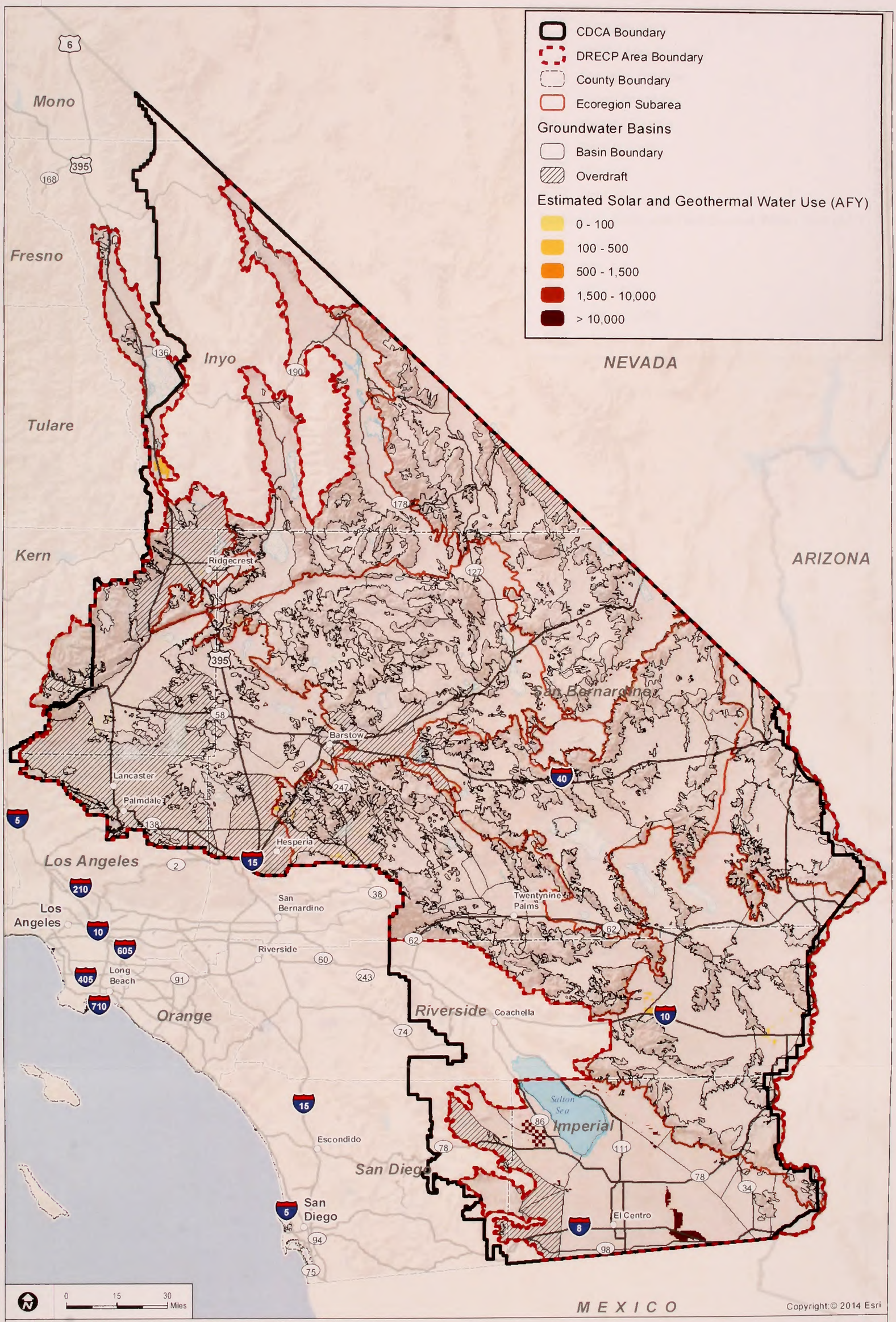
desert basins. Estimated total use is 29,000 ac-ft/yr, and ranges from a minimum of 20 ac-ft/yr (Providence and Bullion Mountains ecoregion subarea) to a maximum of 28,000 ac-ft/yr (Imperial Borrego Valley ecoregion subarea). Wet-cooled geothermal projects account for most of the total water use under Alternative 1. Ninety-seven percent of the water use under Alternative 1 is in the Imperial Borrego Valley ecoregion subarea's 4,000 acres of geothermal projects and 2,000 acres of solar projects.

Under Alternative 1, renewable energy development can be built in a number of overdraft or stressed groundwater basins. Figure IV.6-3 maps the distribution of estimated water use by DFA and overdraft groundwater basins, and Figure IV.6-4 maps the water use by DFA and overdraft and stressed groundwater basins. Development occurs in 18 overdraft and stressed groundwater basins, and the increased groundwater use in these sensitive basins can adversely affect water supplies and exacerbate impacts associated with overdraft conditions and declining groundwater levels.

Table IV.6-3
Renewable Energy Development Area and Estimated Water Use – Alternative 1

Ecoregion Subarea	Renewable Energy Development Focus Area (acres)			MW	Water Use (AFY)
	Solar	*Geothermal*	*Total*		
Cadiz Valley and Chocolate Mountains	4,000	0	7,000	600	200
Imperial Borrego Valley	2,000	4,000	13,000	1,000	28,000
Kingston and Funeral Mountains	0	0	0	0	0
Mojave and Silurian Valley	0	0	3,000	30	200
Owens River Valley	4,000	0	4,000	500	200
Panamint Death Valley	0	0	0	0	0
Pinto Lucerne Valley and Eastern Slopes	2,000	0	5,000	400	100
Piute Valley and Sacramento Mountains	0	0	0	0	0
Providence and Bullion Mountains	300	0	500	40	20
West Mojave and Eastern Slopes	1,000	0	9,000	200	80
Total	**14,000**	**4,000**	**42,000**	**3,000**	**29,000**

Total megawatts for all technologies combined using the energy generation described in Appendix O (Methods for Megawatt Distribution).
Estimated solar thermal water use included industrial processes (0.5 ac-ft/yr/MW) and cooling (minimum estimate of 1 ac-ft/yr/MW represented by dry-cooled technology); photovoltaic water use for cleaning (0.05 ac-ft/yr/MW), and geothermal water use for cooling (assumed wet-cooled technology at 31 ac-ft/yr/MW); water use for wind assumed negligible.
Total development area is the sum of solar, geothermal, wind, and transmission project areas. Note that transmission acres include transmission only within groundwater basins.
Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

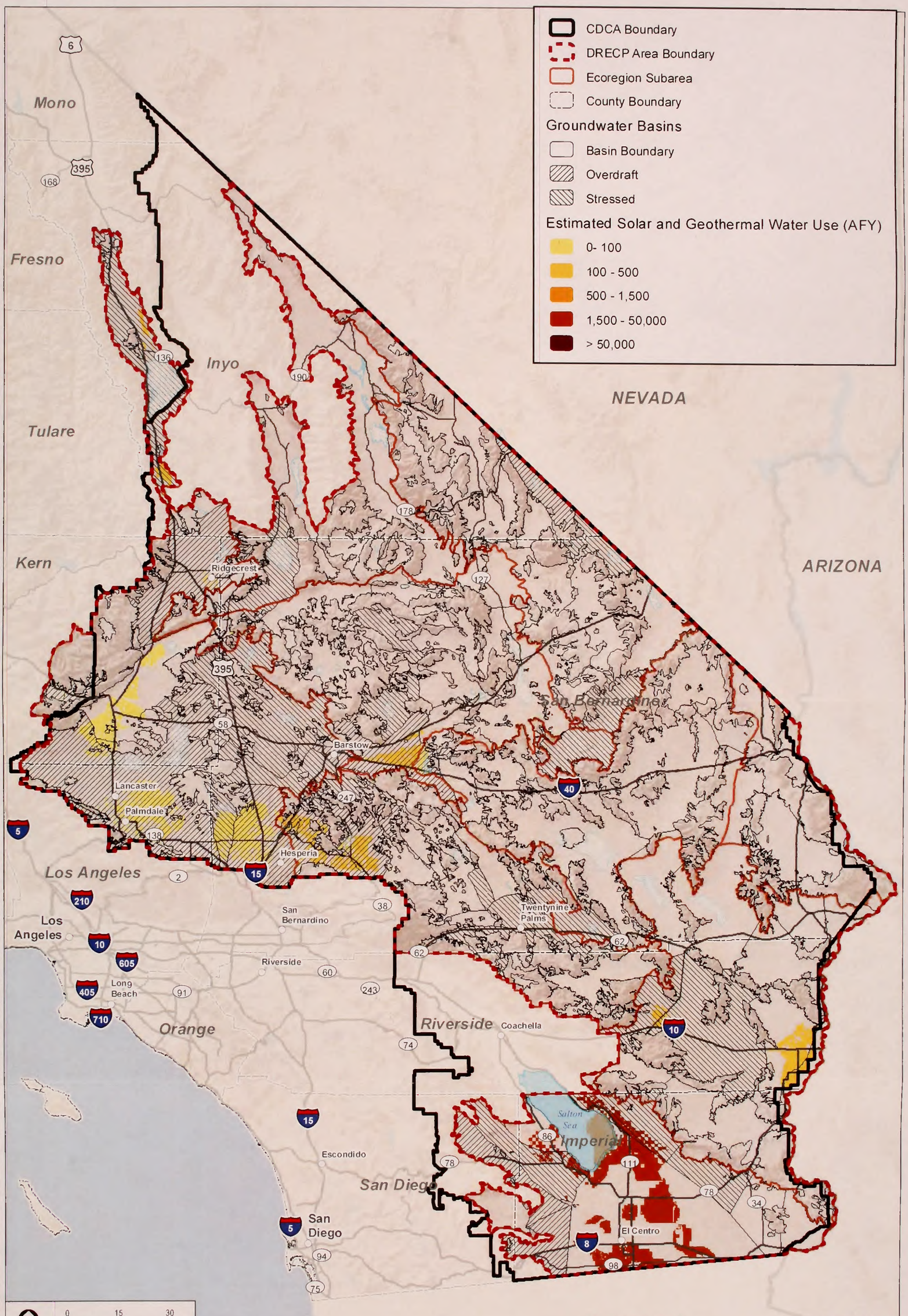


Sources: ESRI (2014); California Department of Water Resources (2003)

FIGURE IV.6-3

Planned Development Areas, Estimated Solar and Geothermal Water Use, and Overdraft Groundwater Basins - Alternative 1

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Sources: ESRI (2013); California Department of Water Resources (2003)

FIGURE IV.6-4

Planned Development Areas, Estimated Solar and Geothermal Water Use, and Overdraft and Stressed Groundwater Basins - Alternative 1

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Under Alternative 1, planned renewable energy development would be in basins hydraulically connected to adjacent areas located outside the DRECP area (See Figure IV.6-3 for the locations and distribution of development areas). Renewable energy projects occur in groundwater basins connected to areas within Mexico (the Imperial Valley Basin, located in the Imperial Borrego Valley ecoregion subarea), and Arizona (Palo Verde Valley Basin, located in the Cadiz Valley and Chocolate Mountain ecoregion subarea). Groundwater level and water supply changes can therefore extend across these boundaries and impact areas outside the DRECP area and the Colorado River.

Alternative 1 designates new NLCS lands, ACECs, and wilderness allocations, expands and reduces existing ACECs, designates new SRMAs and both expands and reduces existing SRMAs, creates buffer corridors along National Scenic and Historic Trails, and manages lands with wilderness characteristics. The BLM LUPA also replaces MUCs, and establishes VRM Classes in the California Desert Conservation Area(CDCA). More than 4.7 million acres are assumed to be in the BLM LUPA land designation under Alternative 1. Because BLM LUPA land designations protect ecological, historic, cultural, scenic, scientific, and recreation resources and values, the use of or access to groundwater resources to meet renewable energy project water requirements would be limited. Groundwater-related CMAs apply and are the same for all alternatives.

Under the proposed BLM LUPA, the only changes outside the DRECP area would be the designation of National Landscape Conservation System (NLCS) lands, ACECs, National Scenic and Historic Trails management corridors, VRM Classes, and new land allocations to replace MUCs on CDCA lands. The estimated acreage of groundwater basins in BLM LUPA lands located outside the DRECP area under the Alternative 1 is summarized in Table R2.6-5 (Appendix R2). Because BLM LUPA land designations outside the DRECP area protect ecological, historic, cultural, scenic, scientific, and recreation resources and values, the use of or access to groundwater resources to meet renewable energy project water requirements would likely be limited.

Impact GW-1: Construction of DRECP components could alter groundwater recharge.

Impacts on groundwater recharge resulting from land disturbance under Alternative 1 would be similar to those shown in Section IV.6.3.1.1. Alternative 1 potentially affects recharge on 70,000 acres.

Impact GW-2: Groundwater consumption lowers groundwater levels, depletes water supplies, and affects groundwater quality and groundwater discharge.

Impacts on groundwater levels would be similar to those shown in Section IV.6.3.1.1. The greatest potential water use is in the Imperial Borrego Valley ecoregion subarea (28,000 ac-

ft/yr), mostly for geothermal technology (4,000 acres) and solar technology (2,000 acres). The remaining water use is mostly for solar technology in the Cadiz Valley and Chocolate Mountains, Mojave and Silurian Valley, Owens River Valley, Pinto Lucerne Valley and Eastern Slopes, Providence and Bullion Mountains, and West Mojave and Western Slopes ecoregion subareas. Sixteen basins within these ecoregion subareas are in overdraft or are stressed (Figure IV.6-4), and groundwater use for renewable energy projects would likely exacerbate depletion of the water supply and the magnitude and scope of adverse impacts.

Impact GW-3: Groundwater consumption could cause land subsidence and permanently decrease storage capacity.

Land subsidence would cause impacts similar to those shown in Section IV.6.3.1.1. As shown in Table IV.6-3, renewable energy water use under Alternative 1 is 29,000 ac-ft/yr, with most of the water use attributed to geothermal and solar development in the Imperial Borrego Valley ecoregion subarea.

Impact GW-4: Groundwater consumption could cause existing poor-quality groundwater to migrate.

Impacts from the potential migration of poor-quality groundwater would be similar to those shown in Section IV.6.3.1.1. The large amount of renewable energy development could affect groundwater quality.

Impact GW-5: Injection of water from geothermal steam generation could contaminate potable water supplies.

The potential for impacts from injection of saline water for geothermal steam water would be as shown in Section IV.6.3.1.1. Geothermal development increases the potential for contamination in the Imperial Borrego Valley ecoregion subarea where all of geothermal development would be located.

Impact GW-6: Chemical spills or brine disposal could contaminate groundwater.

Groundwater contamination from chemical spills or brine disposal would be as shown in Section VI.6.3.1.1.

Impacts on Variance Process Lands

Variance Process Lands are neither reserve lands nor DFAs. They are a subset of the variance lands identified in the Solar PEIS ROD and additional lands that, based on current information, have moderate to low ecological value and ambiguous value for renewable energy. If renewable energy development occurs on Variance Process Lands, a LUPA would

not be required, so the environmental review process would be somewhat simpler than if the location were left undesignated.

Variance Process Lands for each alternative are as shown in Chapter IV.1, Table IV.1-2, and in Volume II, Chapter II.4, Figure II.4-1, for Alternative 1. Development of the Variance Process Lands would have similar air quality effects as described above under Impacts GW-1 through GW-6.

Impact Reduction Strategies

Design Features of the Solar PEIS

The Solar PEIS includes Design Features (Appendix W) that would reduce the impacts of solar energy development, including: measures to control runoff (defined in WR1-1), measures to quantify groundwater aquifers and sustainable yield (defined in WR1-2), measures to secure a reliable and legally available water supply (defined in WR1-3), and impact reduction measures (defined in WR2-1, WR3-1, and WR4-1 for construction, operation, and decommissioning, respectively). These measures would apply only on BLM SEZs and Solar PEIS variance lands.

Conservation and Management Actions

The conservation strategy for Alternative 1 (presented in Volume II, Section II.4.4) defines specific actions that would reduce the impacts of this alternative. The conservation strategy includes definition of the conservation designations and specific CMAs for the Preferred Alternative. The CMAs described in Section IV.6.3.2.1 apply to Alternative 1.

Laws and Regulations

Existing laws and regulations would further reduce the impacts of renewable energy development projects constructed subsequent to the Proposed LUPA. Relevant regulations are presented in the Regulatory Setting in Volume III, and summarized in Section IV.6.3.1.1.

IV.6.3.3.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

The estimated acreage of groundwater basins in Ecological and Cultural Conservation and Recreation Designations is summarized in Table R2.6-6 (Appendix R2). These lands include existing protected areas (LLPAs and MEMLs) and Alternative 1 existing and proposed BLM conservation lands (NLCS lands, ACECs, and wildlife allocations). No renewable energy development is allowed in existing protected areas, and the use of or access to groundwater resources to meet renewable energy project water requirements would be

limited. No adverse impacts are therefore expected to groundwater resources from the conservation and recreation designations. Under Alternative 1, renewable energy development is restricted on over 2.4 million acres within 37 overdraft or stressed groundwater basins, protecting and preserving groundwater and water supply conditions in these areas.

IV.6.3.3.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside the DRECP area on groundwater, water supply, and water quality would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.6.3.1.3, Impacts of Transmission Outside the DRECP Area, in the No Action Alternative.

IV.6.3.3.4 Comparison of Alternative 1 With Preferred Alternative

Alternative 1 would facilitate development of 28,000 acres less area for renewable energy projects than the Preferred Alternative (42,000 acres versus 70,000 acres, respectively). This lowers the potential for chemical spills and groundwater contamination, but existing regulations and BMPs would reduce potential groundwater contamination impacts in both alternatives. Renewable energy development can potentially alter groundwater recharge; but with mitigation, these changes may increase groundwater recharge (e.g., installing pervious groundcover and directing runoff flows from a greater area to percolation basins). Because the developed area is smaller under Alternative 1, there is less potential to increase groundwater recharge, relative to the Preferred Alternative.

Renewable energy projects in Alternative 1 are estimated to use less water than in the Preferred Alternative (29,000 ac-ft/yr versus 44,000 ac-ft/yr, respectively), with most of the water use for both alternatives from geothermal and solar technologies concentrated in the Imperial Borrego Valley. Existing regulations, implementation of CMAs, and additional measures required for renewable energy projects would reduce impacts under both alternatives. However, impacts from geothermal water use would remain for both the Preferred Alternative and Alternative 1.

Geographic Distinctions

Solar and geothermal technologies account for most renewable energy related water use, so the geographic locations of these projects are important to consider. Alternative 1 develops solar and geothermal projects in 18 of the 39 overdraft or stressed basins identified in the DRECP area (Figure IV.6-4); the Preferred Alternative develops projects in 15 overdraft or stressed basins (Figure IV.6-2). Alternative 1 therefore develops projects in more sensitive groundwater basins. Existing regulations, implementation of the CMAs, and

additional measures required for renewable energy projects would mitigate impacts from development under both alternatives.

Under Alternative 1, no development is proposed in the Kingston and Funeral Mountains, Panamint Death Valley, and Piute Valley and Sacramento Mountains ecoregion subareas. Two of these ecoregion subareas (Kingston and Funeral Mountains and Panamint Death Valley) have proposed development under the Preferred Alternative. Under Alternative 1 there is no developed area adjacent to Nevada and the developed area is smaller adjacent to Mexico and Arizona (the Imperial Valley and Palo Verde Valley basins, respectively), reducing the potential for groundwater level and water supply changes that extend across their boundaries and impact areas outside the DRECP area, including the Colorado River.

IV.6.3.4 Alternative 2

IV.6.3.4.1 Impacts of Renewable Energy and Transmission

Alternative 2 integrates renewable energy components, BLM LUPA components, and other conservation components of the DRECP Preferred Alternative. It includes geographically dispersed and maximized DFAs on BLM lands with expanded wind opportunities. The estimated renewable energy development pattern emphasizes:

- Dispersed solar and wind development.
- Geothermal development in two ecoregion subareas: Imperial Borrego Valley and Owens River Valley.

Impact Assessment

Potential renewable energy development on BLM lands within the DRECP area under Alternative 2 is shown in Table IV.6-4 (solar only, geothermal only, and total renewable energy development for all technologies, including wind and transmission). Development would be in 36 groundwater basins. Most (81%) of the developed area is within three ecoregion subareas: Cadiz Valley and Chocolate Mountains, Imperial Borrego Valley, and West Mojave and Eastern Slopes. Geothermal projects are in the Imperial Borrego Valley and Owens River Valley ecoregion subareas. One ecoregion subarea, Piute Valley and Sacramento Mountains, has no development under Alternative 2.

Table IV.6-4 shows the estimated total new water use by solar and geothermal projects within each ecoregion subarea. Total water use was calculated using the projected megawatt distribution and water use factors described in Section IV.6.1, Approach to Impact Analysis. The water use shown in Table IV.6-2 assumes that dry-cooled solar

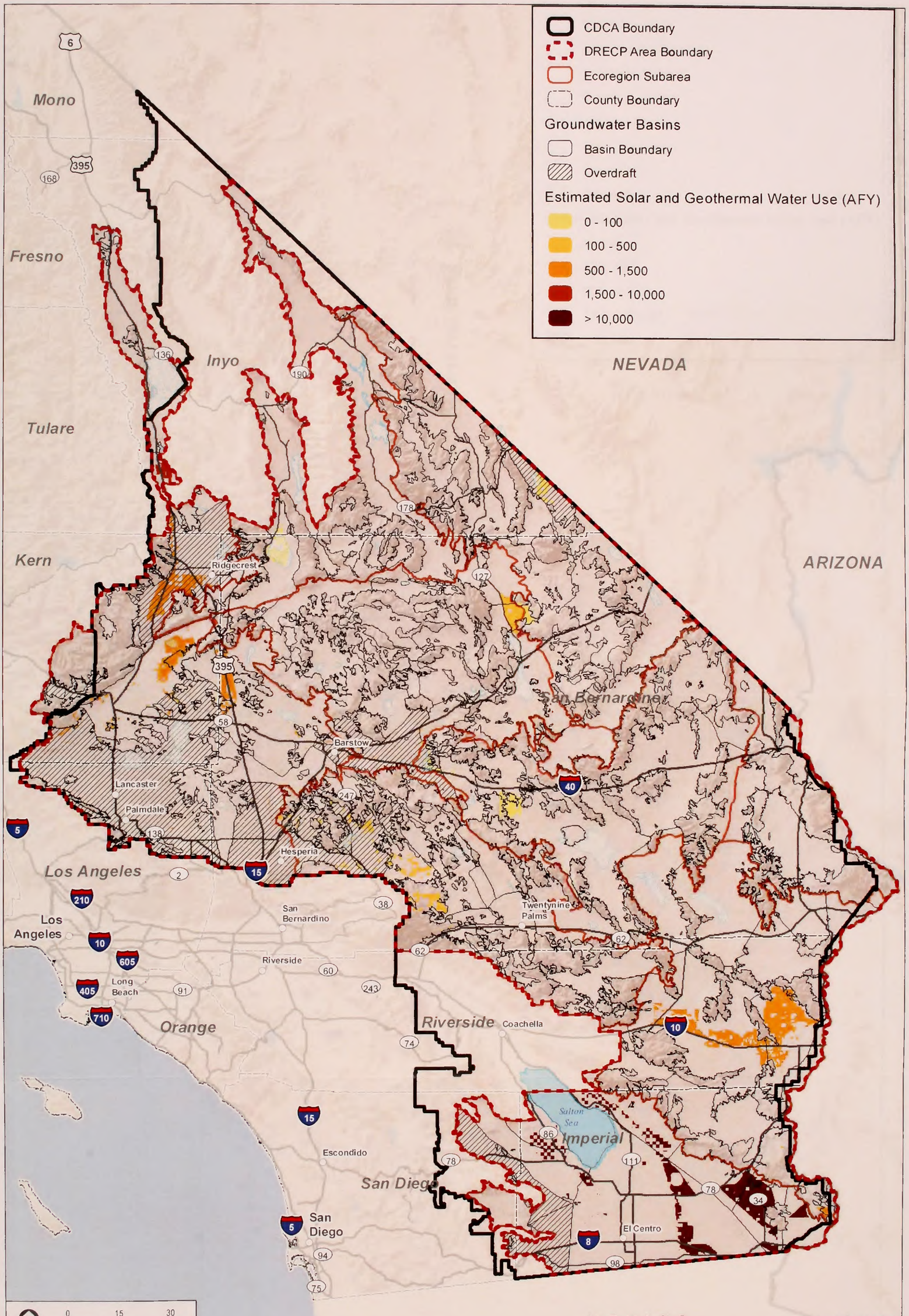
thermal technology will be used because of water scarcity in the desert basins. Estimated total use is 44,000 ac-ft/yr, and ranges from a minimum of 30 ac-ft/yr (Panamint Death Valley ecoregion subarea) to a maximum of 36,000 ac-ft/yr (Imperial Borrego Valley ecoregion subarea); there is no development and therefore no renewable energy water use in the Piute Valley and Sacramento Mountains ecoregion subarea. Wet-cooled geothermal projects account for almost 42,000 ac-ft/yr of the total water use under Alternative 2. Eighty-two percent of the water use under Alternative 2 is in the Imperial Borrego Valley ecoregion subareas because there are 6,000 acres of geothermal technology and 8,000 acres of solar technology.

Table IV.6-4
Renewable Energy Development Area and Estimated Water Use – Alternative 2

Ecoregion Subarea	Renewable Energy Development Focus Area (acres)			MW	Water Use (AFY)
	Solar	*Geothermal*	*Total*		
Cadiz Valley and Chocolate Mountains	11,000	0	16,000	3,000	600
Imperial Borrego Valley	8,000	6,000	19,000	4,000	36,000
Kingston and Funeral Mountains	1,000	0	1,000	200	50
Mojave and Silurian Valley	2,000	0	5,000	500	200
Owens River Valley	400	1,000	1,000	300	6,000
Panamint Death Valley	600	0	700	100	30
Pinto Lucerne Valley and Eastern Slopes	2,000	0	6,000	1,000	100
Piute Valley and Sacramento Mountains	0	0	0	0	0
Providence and Bullion Mountains	1,000	0	2,000	400	50
West Mojave and Eastern Slopes	12,000	0	29,000	2,000	600
Total	**39,000**	**7,000**	**79,000**	**11,000**	**44,000**

Total megawatts for all technologies combined using the energy generation described in Appendix O (Methods for Megawatt Distribution).
Estimated solar thermal water use included industrial processes (0.5 ac-ft/yr/MW) and cooling (minimum estimate of 1 ac-ft/yr/MW represented by dry-cooled technology); photovoltaic water use for cleaning (0.05 ac-ft/yr/MW), and geothermal water use for cooling (assumed wet-cooled technology at 31 ac-ft/yr/MW); water use for wind assumed negligible.
Total development area is the sum of solar, geothermal, wind, and transmission project areas. Note that transmission acres include transmission only within groundwater basins.
Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Under Alternative 2, renewable energy development can occur in a number of overdraft basins and groundwater basins identified as stressed. Figure IV.6-5 maps the distribution of estimated water use by DFA and overdraft groundwater basins, and Figure IV.6-6 maps the water use by DFA and by overdraft and stressed groundwater basins.

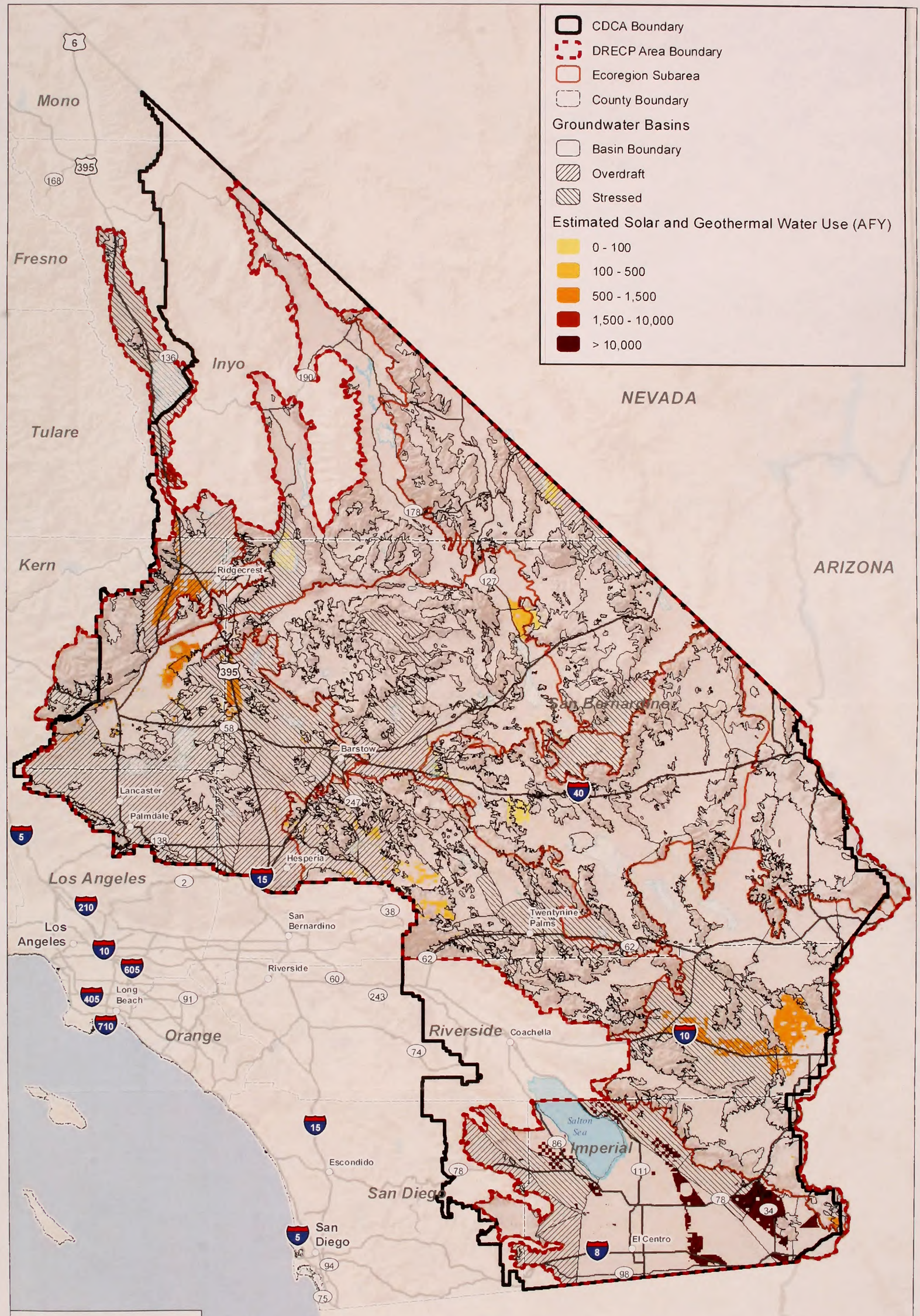


Sources: ESRI (2014); California Department of Water Resources (2003)

FIGURE IV.6-5

Planned Development Areas, Estimated Solar and Geothermal Water Use, and Overdraft Groundwater Basins - Alternative 2

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Sources: ESRI (2014); California Department of Water Resources (2003)

FIGURE IV.6-6

Planned Development Areas, Estimated Solar and Geothermal Water Use, and Overdraft and Stressed Groundwater Basins - Alternative 2

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Development occurs in 19 overdraft and stressed groundwater basins, and increased groundwater use in these sensitive basins can adversely affect water supplies and exacerbate impacts from overdraft conditions and declining groundwater levels.

Some of the developed basins under Alternative 2 can be hydraulically connected to areas located outside the DRECP area. Renewable energy projects occur in groundwater basins connected to areas within Mexico (the Imperial Valley Ogilby Valley basins, located in the Imperial Borrego Valley ecoregion subarea), Nevada (the Pahrump Valley Basin, located in the Kingston and Funeral Mountains ecoregion subarea), and Arizona (Yuma Valley Basin, located in the Imperial Borrego Valley and Cadiz Valley and Chocolate Mountain ecoregion subareas). Groundwater level and water supply changes can therefore extend across these boundaries and impact areas outside the DRECP area including the Colorado River.

Alternative 2 designates new NLCS lands, new ACECs and wildlife allocations, expands and reduces existing ACECs, designates new SRMAs, expands and reduces existing SRMAs, creates buffer corridors along National Scenic and Historic Trails, and manages lands with wilderness characteristics. The BLM LUPA also replaces MUCs, and establishes VRM Classes in the CDCA. More than 6.6 million acres are assumed allocated in the BLM LUPA land designation under Alternative 2. Because BLM LUPA land designations protect ecological, historic, cultural, scenic, scientific, and recreation resources and values, the use of or access to groundwater resources to meet renewable energy project water requirements would likely be limited. Groundwater-related CMAs are the same for all alternatives.

Under the Proposed BLM LUPA, the only changes outside the DRECP area would be the designation of NLCS lands, ACECs, and National Scenic and Historic Trails management corridors, VRM Classes, and new land allocations to replace MUCs on CDCA lands. The estimated acres of groundwater basins in BLM LUPA lands located outside the DRECP area under the Alternative 2 are summarized in Table R2.6-7 (Appendix R2). Because the BLM LUPA land designations outside the DRECP area protect ecological, historic, cultural, scenic, scientific, and recreation resources and values, the use of or access to groundwater resources to meet renewable energy project water requirements would likely be limited.

Impact GW-1: Construction of DRECP components could alter groundwater recharge.

Impacts on groundwater recharge from land disturbance under Alternative 2 would be similar to those shown in Section IV.6.3.1.1. Alternative 2 potentially affects recharge on 79,000 acres.

Impact GW-2: Groundwater consumption lowers groundwater levels, depletes water supplies, and affects groundwater quality and groundwater discharge.

Impacts on groundwater levels would be similar to those shown in Section IV.6.3.1.1. The greatest water use is in the Imperial Borrego Valley and Owens River Valley ecoregion subareas (42,000 ac-ft/yr), where most of the water use is for geothermal technology (7,000 acres) and solar technology (8,400 acres). The remaining water use is mostly for solar technology in the Cadiz Valley and Chocolate Mountains, Mojave and Silurian Valley, Pinto Lucerne Valley and Eastern Slopes, and West Mojave and Western Slopes ecoregion subareas. Nineteen basins within these ecoregion subareas are in overdraft or are characterized as stressed (Figure IV.6-6), and groundwater use for renewable energy projects will likely exacerbate depletion of the water supply and the magnitude and scope of adverse impacts.

Impact GW-3: Groundwater consumption could cause land subsidence and permanently decrease storage capacity.

Land subsidence would cause impacts similar to those shown in Section IV.6.3.1.1. As shown in Table IV.6-4, renewable energy water use under Alternative 2 is 44,000 ac-ft/yr, with most of the water use attributed to geothermal and solar technologies in the Imperial Borrego Valley.

Impact GW-4: Groundwater consumption could cause existing poor-quality groundwater to migrate.

Impacts from the potential migration of poor-quality groundwater would be similar to those shown in Section IV.6.3.1.1. The large amount of potential groundwater use could cause poor-quality groundwater to migrate.

Impact GW-5: Injection of water from geothermal steam generation could contaminate potable water supplies.

The potential for impacts from the injection of saline water for geothermal steam water is shown in Section IV.6.3.1.1. Geothermal development increases the potential for contamination, particularly in the Imperial Borrego Valley and Owens River Valley ecoregion subareas where geothermal development would occur.

Impact GW-6: Chemical spills or brine disposal could contaminate groundwater.

Groundwater contamination from chemical spills or brine disposal is shown in Section VI.6.3.1.1.

Impacts on Variance Process Lands

Variance Process Lands are neither reserve lands nor DFAs. They are a subset of the variance lands identified in the Solar PEIS ROD and additional lands that, based on current information, have moderate to low ecological value and ambiguous value for renewable energy. If renewable energy development occurs on Variance Process Lands, a LUPA would not be required, so the environmental review process would be somewhat simpler than if the location were left undesignated.

Variance Process Lands for each alternative are shown in Chapter IV.1, Table IV.1-2 and in Volume II, Chapter II.5, Figure II.5-1 for Alternative 2. Development of Variance Process Lands would have similar air quality effects as described in Impacts GW-1 through GW-6.

Impact Reduction Strategies

Design Features of the Solar PEIS

The Solar PEIS includes Design Features (Appendix W) that would reduce the impacts of solar energy development, including: measures to control runoff (defined in WR1-1), measures to quantify groundwater aquifers and sustainable yield (defined in WR1-2), measures to secure a reliable and legally available water supply (defined in WR1-3), and impact reduction measures (defined in WR2-1, WR3-1, and WR4-1 for construction, operation, and decommissioning, respectively). These measures would apply only on BLM SEZs and Solar PEIS variance lands.

Conservation and Management Actions

The conservation strategy for Alternative 2 (presented in Volume II, Section II.5.4) defines specific actions that would reduce the impacts of this alternative. The conservation strategy includes definition of the conservation designations and specific CMAs for the Preferred Alternative. The CMAs described in Section IV.6.3.2.1 apply to Alternative 2.

Laws and Regulations

Existing laws and regulations would further reduce the impacts of renewable energy development projects constructed subsequent to the Proposed LUPA. Relevant regulations are presented in the Regulatory Setting in Volume III, and summarized in Section IV.6.3.1.1.

IV.6.3.4.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

The estimated acreage of groundwater basins in Ecological and Cultural Conservation and Recreation Designations is summarized in Table R2.6-8 (Appendix R2). These lands include existing protected areas (LLPAs and MEMLs) and Alternative 2 existing and proposed BLM conservation lands (NLCS lands, ACECs, and wildlife allocations). No renewable energy development is allowed on existing protected areas, and the use of or access to groundwater resources to meet renewable energy project water requirements would likely be limited. Accordingly, no adverse impacts are expected to groundwater resources because of the conservation and recreation designations. Under Alternative 2, renewable energy development is restricted on over 2.5 million acres within 37 overdraft or stressed groundwater basins, thereby protecting and preserving groundwater and water-supply conditions in these sensitive areas.

IV.6.3.4.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside the DRECP area on groundwater, water supply, and water quality would be the same under all alternatives. These impacts are as described in the No Action Alternative in Section IV.6.3.1.3, Impacts of Transmission Outside the DRECP Area in the No Action Alternative.

IV.6.3.4.4 Comparison of Alternative 2 With Preferred Alternative

Alternative 2 develops 9,000 acres more land for renewable energy projects than the Preferred Alternative (79,000 acres versus 70,000 acres, respectively). This increases the potential for chemical spills and groundwater contamination, but existing regulations and Best Management Practices (BMPs) reduce potential groundwater contamination impacts in both alternatives. Land disturbances resulting from renewable energy development have the potential to alter groundwater recharge, but with mitigation these changes may increase groundwater recharge. Alternative 2 therefore has greater potential to increase groundwater recharge over a greater area relative to the Preferred Alternative.

Renewable energy projects in Alternative 2 are estimated to use the same amount of water as the Preferred Alternative (44,000), with most of the use for both alternatives concentrated in solar and geothermal technologies in the Imperial Borrego Valley ecoregion subarea. The CMAs and associated mitigation apply to either alternative, and ensure that no project is approved unless it is shown that the water supply is adequate to support development without causing an adverse impact.

Geographic Distinctions

Solar and geothermal technologies account for most renewable energy-related water use, so the locations of these projects are important to consider. Alternative 2 develops solar and geothermal projects in 19 of the 39 overdraft or stressed basins identified in the DRECP area (Figure IV.6-6); the Preferred Alternative develops projects in 15 overdraft or stressed basins (Figure IV.6-2). Alternative 2 therefore develops projects in a greater number of sensitive groundwater basins. The CMAs and associated mitigation apply to either alternative, and ensure that no project is approved unless it is shown that the water supply is adequate to support development without causing an adverse impact.

Development occurs in the Pahrump Valley Basin under Alternative 2. Groundwater in deep limestone formations beneath the Pahrump Valley Basin and surrounding areas may support groundwater discharge to the Amargosa River and springs located along the east side of the Death Valley Basin. The Preferred Alternative and Alternative 2 also plan for development in the Imperial Valley and Palo Verde Mesa basins, creating the potential for groundwater level and water supply changes that extend across the DRECP area boundaries and impact areas in Mexico and Arizona and the Colorado River.

IV.6.3.5 Alternative 3

IV.6.3.5.1 Impacts of Renewable Energy and Transmission

Alternative 3 integrates renewable energy, BLM LUPA components, and conservation components of the DRECP Preferred Alternative in the DRECP area. It includes geographically dispersed DFAs on BLM lands, and emphasizes solar and geothermal technologies. The estimated renewable energy development pattern include:

- Dispersed solar with emphasis in two ecoregion subareas: Cadiz Valley and Chocolate Mountains and Imperial Borrego Valley.
- Emphasis on wind in three ecoregion subareas: Cadiz Valley and Chocolate Mountains, Imperial Borrego Valley, and Pinto Lucerne Valley and Eastern Slopes.
- Geothermal in two ecoregion subareas: Imperial Borrego Valley and Owens River Valley.

Impact Assessment

Potential renewable energy development area on BLM lands within DRECP area groundwater basins under Alternative 3 is shown in Table IV.6-5 (solar only, geothermal only, and total renewable energy development for all technologies, including wind and transmission). Development would occur in 25 groundwater basins. Most (87%) of the developed area is within four ecoregion subareas: Cadiz Valley and Chocolate Mountains,

Imperial Borrego Valley, Pinto Lucerne Valley and Eastern Slopes, and West Mojave and Eastern Slopes. There are geothermal projects in the Imperial Borrego Valley (6,000 acres) and Owens River Valley (1,000 acres) ecoregion subareas. Two ecoregion subareas (Kingston and Funeral Mountains and Piute Valley and Sacramento Mountains) have no development under Alternative 3.

Table IV.6-5 shows the estimated total new water use by solar and geothermal projects within each ecoregion subarea. Total estimated water use was calculated using the projected megawatt distribution and water use factors described in Section IV.6.1, Approach to Impact Analysis. The water use shown in Table IV.6-5 assumes that dry-cooled solar thermal technology will be used because of water scarcity in the desert basins. Estimated total use is 44,000 ac-ft/yr, and ranges from a minimum of 60 ac-ft/yr (Providence and Bullion Mountains ecoregion subarea) to a maximum of 37,000 ac-ft/yr (Imperial Borrego Valley ecoregion subarea) in the ecoregion subareas were development would occur. Wet-cooled geothermal projects account for almost 42,000 ac-ft/yr of the total water use under Alternative 3. Ninety eight percent of the water use under Alternative 3 is in the Imperial Borrego Valley and Owens River Valley ecoregion subareas because there are 7,000 acres of geothermal projects and 12,000 acres of solar projects.

Under Alternative 3, renewable energy development can be sited in a number of overdraft basins or stressed groundwater basins. Figure IV.6-7 maps the distribution of estimated water use by DFA and overdraft groundwater basins, and Figure IV.6-8 maps the water use by DFA and overdraft and stressed groundwater basins. Development occurs in 17 overdraft and stressed groundwater basins, and increased groundwater use in these sensitive basins can adversely affect water supplies and exacerbate impacts associated with overdraft conditions and declining groundwater levels.

Table IV.6-5
Renewable Energy Development Area and Estimated Water Use – Alternative 3

Ecoregion Subarea	Renewable Energy Development Focus Area (acres)			MW	Water Use (AFY)
	Solar	*Geothermal*	*Total*		
Cadiz Valley and Chocolate Mountains	8,000	0	12,000	1,000	400
Imperial Borrego Valley	11,000	6,000	23,000	3,000	37,000
Kingston and Funeral Mountains	0	0	0	0	0
Mojave and Silurian Valley	600	0	3,000	100	100
Owens River Valley	1,000	1,000	2,000	300	6,000
Panamint Death Valley	1,000	0	2,000	200	100
Pinto Lucerne Valley and Eastern Slopes	3,000	0	6,000	500	100
Piute Valley and Sacramento Mountains	0	0	0	0	0

Table IV.6-5
Renewable Energy Development Area and Estimated Water Use – Alternative 3

Ecoregion Subarea	Renewable Energy Development Focus Area (acres)			MW	Water Use (AFY)
	Solar	*Geothermal*	*Total*		
Providence and Bullion Mountains	1,000	0	1,000	200	60
West Mojave and Eastern Slopes	4,000	0	5,000	600	200
Total	**29,000**	**7,000**	**53,000**	**6,000**	**44,000**

Total megawatts for all technologies combined using the energy generation described in Appendix O (Methods for Megawatt Distribution).
Estimated solar thermal water use included industrial processes (0.5 ac-ft/yr/MW) and cooling (minimum estimate of 1 ac-ft/yr/MW represented by dry-cooled technology); photovoltaic water use for cleaning (0.05 ac-ft/yr/MW), and geothermal water use for cooling (assumed wet-cooled technology at 31 ac-ft/yr/MW); water use for wind assumed negligible.
Total development area is the sum of solar, geothermal, wind, and transmission project areas. Note that transmission acres include transmission only within groundwater basins.
Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table

Under Alternative 3, planned renewable energy development would be in basins hydraulically connected to adjacent areas located outside the DRECP area. (See Figure IV.6-7 for the locations and distribution of development areas.) Renewable energy projects occur in groundwater basins connected to areas within Mexico (the Imperial Valley and Ogilby Valley basins, located in the Imperial Borrego Valley ecoregion subarea), and Arizona (Palo Verde Mesa basin, located in the Cadiz Valley and Chocolate Mountain ecoregion subarea). Groundwater level and water supply changes can therefore extend across these boundaries and impact areas outside the DRECP area including the Colorado River.

Alternative 3 designates new NLCS lands, new ACECs and wildlife allocations, expands and reduces existing ACECs, designates new SRMAs, and expands and reduces existing SRMAs, creates buffer corridors along National Scenic and Historic Trails, and manages lands with wilderness characteristics. The BLM LUPA also replaces MUCs and establishes VRM Classes in the CDCA. More than 6.7 million acres are assumed to be allocated in the BLM LUPA land designation under Alternative 3. Because the BLM LUPA land designations under Alternative 3 protect ecological, historic, cultural, scenic, scientific, and recreation resources and values, the use of or access to groundwater resources to meet renewable energy project water requirements would likely be limited. Groundwater-related CMAs are the same for all alternatives.

Under the Proposed BLM LUPA, the only changes outside the DRECP area would be the designation of NLCS lands, ACECs, and National Scenic and Historic Trails management corridors, VRM Classes, and new land allocations to replace MUCs on CDCA lands. The estimated acres of groundwater basins in BLM LUPA lands outside the DRECP area under Alternative 3 are summarized in Table R2.6-9 (Appendix R2). Because the BLM LUPA land designations outside the DRECP area protect ecological, historic, cultural, scenic, scientific, and recreation resources and values, the use of or access to groundwater resources to meet renewable energy project water requirements would likely be limited.

Impact GW-1: Construction of DRECP components could alter groundwater recharge.

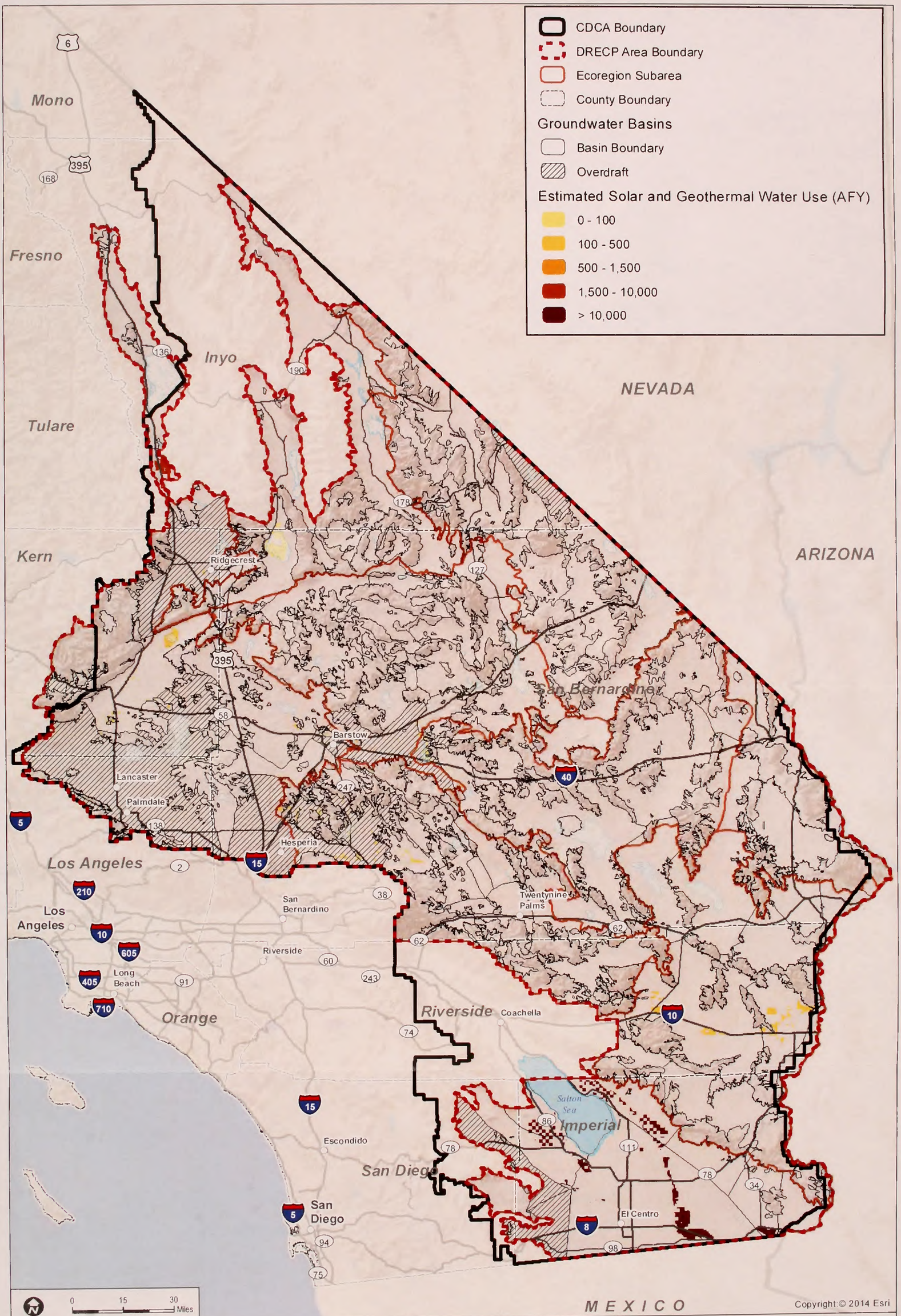
Impacts on groundwater recharge resulting from land disturbance under Alternative 3 would be similar to those shown in Section IV.6.3.1.1. Alternative 3 potentially affects recharge on 53,000 acres.

Impact GW-2: Groundwater consumption lowers groundwater levels, depletes water supplies, and affects groundwater quality and groundwater discharge.

Impacts on groundwater levels would be similar to those shown in Section IV.6.3.1.1. The greatest potential water use is in the Imperial Borrego Valley (37,000 ac-ft/yr) ecoregion subarea, mostly for geothermal technology (6,000 acres) and solar technology (11,000 acres). An additional 6,000 ac-ft/yr of water use is also planned in the Owens River Valley ecoregion subarea, and that water use is also primarily for geothermal and solar technologies (1,000 and 1,000 acres, respectively). The remaining water use in the DRECP area is for solar technology located in the Cadiz Valley and Chocolate Mountains, Mojave and Silurian Valley, Panamint Death Valley, Pinto Lucerne Valley and Eastern Slopes, Providence and Bullion Mountains, and West Mojave and Western Slopes ecoregion subareas. Seventeen basins within these ecoregion subareas are in overdraft or characterized as stressed (Figure IV.6-8), and groundwater use for renewable energy projects will likely exacerbate depletion of the water supply and increase the magnitude and scope of adverse impacts.

Impact GW-3: Groundwater consumption could cause land subsidence and permanently decrease storage capacity.

Land subsidence would cause impacts similar to those shown in Section IV.6.3.1.1. As shown in Table IV.6-5, renewable energy water use under Alternative 3 is 44,000 ac-ft/yr, with most of the water use attributed to geothermal and solar development in the Imperial Borrego Valley ecoregion subarea.

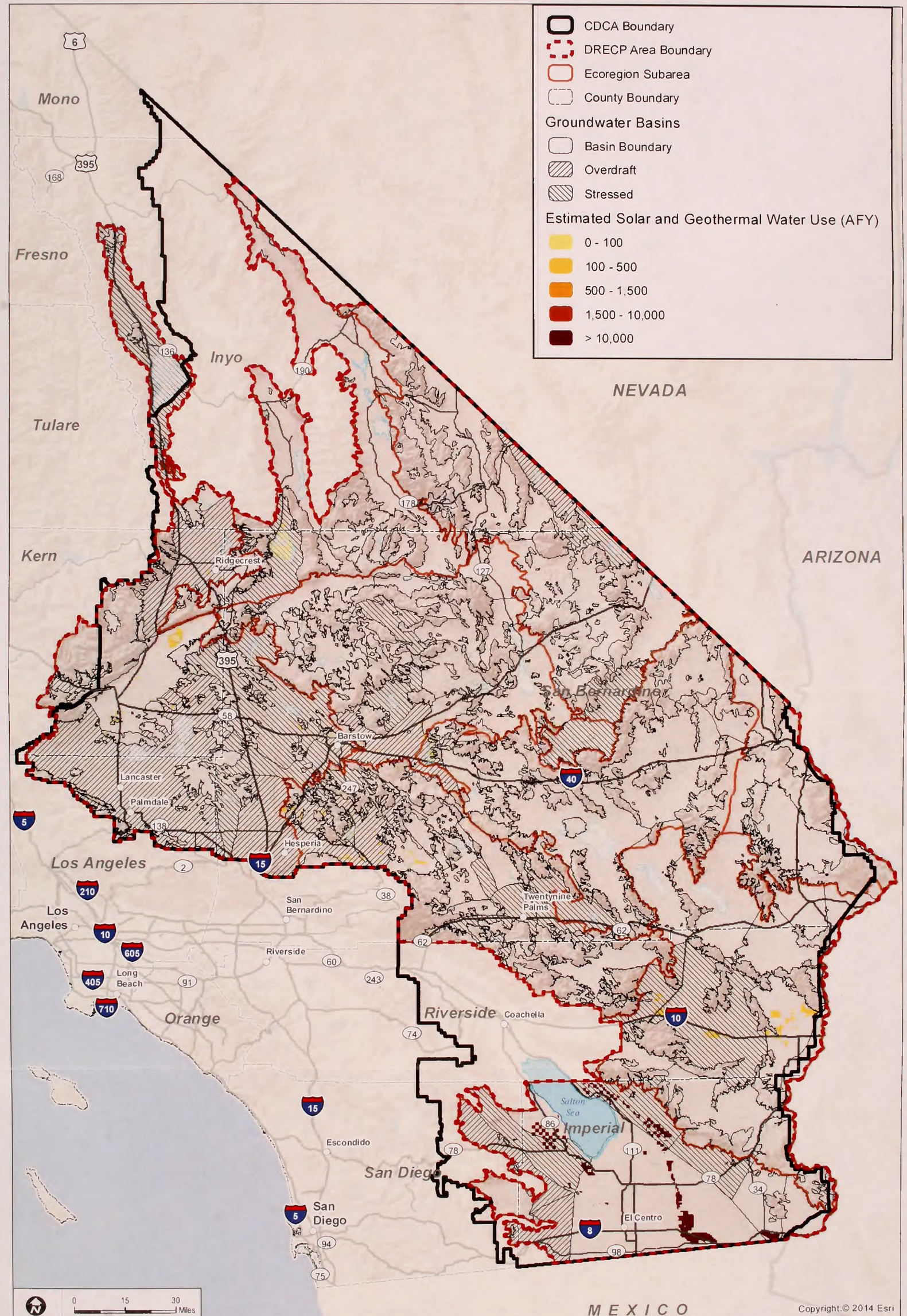


Sources: ESRI (2014); California Department of Water Resources (2003)

FIGURE IV.6-7

Planned Development Areas, Estimated Solar and Geothermal Water Use, and Overdraft Groundwater Basins - Alternative 3

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Sources: ESRI (2014); California Department of Water Resources (2003)

FIGURE IV.6-8

Planned Development Areas, Estimated Solar and Geothermal Water Use, and Overdraft and Stressed Groundwater Basins - Alternative 3

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Impact GW-4: Groundwater consumption could cause existing poor-quality groundwater to migrate.

Impacts from the potential migration of poor-quality groundwater would be similar to those shown in Section IV.6.3.1.1. The large amount of renewable energy development could affect groundwater quality.

Impact GW-5: Injection of water for geothermal steam generation could contaminate potable water supplies.

The potential for impacts from injection of saline water for geothermal steam water would be as shown in Section IV.6.3.1.1. Geothermal development increases the potential for contamination, with potential impacts in the Imperial Borrego Valley and Owens River Valley ecoregion subareas.

Impact GW-6: Chemical spills or brine disposal could contaminate groundwater.

Groundwater contamination from chemical spills or brine disposal would be as shown in Section VI.6.3.1.1.

Impacts on Variance Process Lands

Variance Process Lands are neither reserve lands nor DFAs. They are a subset of the variance lands identified in the Solar PEIS ROD and additional lands that, based on current information, have moderate to low ecological value and ambiguous value for renewable energy. If renewable energy development occurs on Variance Process Lands, a LUPA would not be required, so the environmental review process would be somewhat simpler than if the location were left undesignated.

Variance Process Lands for each alternative are as shown in Chapter IV.1, Table IV.1-2 and in Volume II, Chapter II.5, Figure II.5-1 for Alternative 3. Development of the Variance Process Lands would have similar air quality effects as described above under Impacts GW-1 through GW-6.

Impact Reduction Strategies

Design Features of the Solar PEIS

The Solar Programmatic EIS (PEIS) includes Design Features (Appendix W) that would reduce the impacts of solar energy development, including: measures to control runoff (defined in WR1-1); measures to quantify groundwater aquifers and sustainable yield (defined in WR1-2); measures to secure a reliable and legally available water supply (defined in WR1-3); and impact reduction measures (defined in WR2-1, WR3-1, and WR4-1 for

construction, operation, and decommissioning, respectively). These measures would apply only on BLM Solar Energy Zones and Solar PEIS variance lands.

Conservation and Management Actions

The conservation strategy for Alternative 3 (presented in Volume II, Section II.6.4) defines specific actions to reduce the impacts of this alternative. The conservation strategy includes definition of the Conservation Designations and specific CMAs for the Preferred Alternative. The CMAs described in Section IV.6.3.2 apply to Alternative 3.

Laws and Regulations

Existing laws and regulations would further reduce the impacts of renewable energy development projects constructed subsequent to the Proposed LUPA. Relevant regulations are presented in the Regulatory Setting in Volume III, and summarized in Section IV.6.3.1.1.

IV.6.3.5.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

The estimated acreage of groundwater basins in Ecological and Cultural Conservation and Recreation Designations for Alternative 3 is summarized in Table R2.6-10 (Appendix R2). These lands include existing protected areas (LLPAs and MEMLs) and Alternative 3 existing and Proposed BLM conservation lands (NLCS lands, ACECs, and wildlife allocations). No renewable energy development is allowed in existing protected areas, and the use of or access to groundwater resources to meet renewable energy project water requirements would likely be limited. Accordingly, no adverse impacts are expected to groundwater resources from the conservation and recreation designations. Under Alternative 3, renewable energy development is restricted from over 2.3 million acres located within 37 overdraft or stressed groundwater basins, thereby protecting and preserving groundwater and water-supply conditions in these areas.

IV.6.3.5.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside the DRECP area on groundwater, water supply, and water quality would be the same under all alternatives. These impacts are as described for the No Action Alternative in Section IV.6.3.1.3, Impacts of Transmission Outside the DRECP Area in the No Action Alternative.

IV.6.3.5.4 Comparison of Alternative 3 With Preferred Alternative

Alternative 3 develops 17,000 acres less land for renewable energy projects than the Preferred Alternative (53,000 acres versus 70,000 acres, respectively). This decreases the

potential for chemical spills and groundwater contamination, but existing regulations and BMPs reduce potential groundwater contamination impacts in both alternatives. Renewable energy development has the potential to alter groundwater recharge; with mitigation, these changes may increase groundwater recharge (e.g., installing pervious groundcover and directing runoff flows from a greater area to percolation basins). Because the developed area is smaller, Alternative 3 therefore has less potential to increase groundwater recharge relative to the Preferred Alternative.

Renewable energy projects in Alternative 3 are estimated to use the same amount of water as the Preferred Alternative (44,000 ac-ft/yr), with most of the use for both alternatives for geothermal projects in the Imperial Borrego Valley and Owens River Valley ecoregion subareas. The CMAs and associated mitigation apply to either alternative, and ensure that no project is approved unless it is shown that the water supply is adequate to support development without causing an adverse impact.

Geographic Distinctions

Solar and geothermal technologies account for most renewable energy-related water use, so the locations of these projects are important to consider. Alternative 3 develops solar and geothermal projects in 17 of the 39 overdraft or stressed groundwater basins in the DRECP area (Figure IV.6-8), where the Preferred Alternative develops projects in 15 of the basins (Figure IV.6-2). Alternative 3 therefore develops projects within a greater number of stressed groundwater basins than the Preferred Alternative. The CMAs and associated mitigation apply to either alternative and ensure that no project is approved unless it is shown that the water supply is adequate to support development without causing an adverse impact.

Relative to the Preferred Alternative, the development area under Alternative 3 does not include areas adjacent to Nevada, reducing the potential for groundwater level and water supply changes that could extend across the boundary and impact areas outside the DRECP area.

IV.6.3.6 Alternative 4

IV.6.3.6.1 Impacts of Renewable Energy and Transmission

Alternative 4 integrates the renewable energy BLM LUPA components, and other conservation components of the DRECP Preferred Alternative. It includes geographically dispersed DFAs on BLM lands with an expected mix of solar, wind, and geothermal technologies. The estimated renewable energy development patterns include:

- Emphasis on solar in the Cadiz Valley and Chocolate Mountains ecoregion subarea.

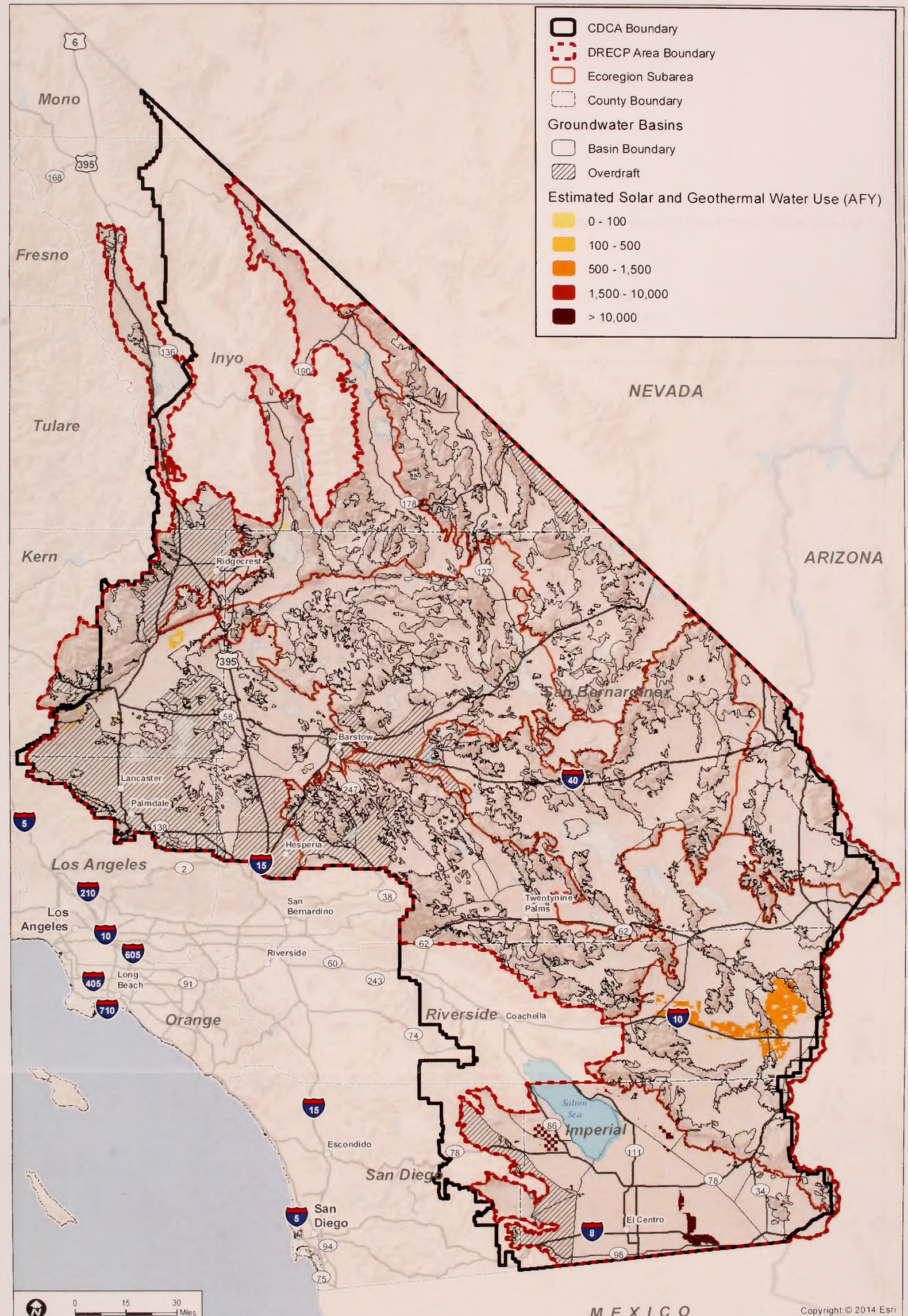
- Most wind development in the Cadiz Valley and Chocolate Mountains ecoregion subarea.
- Geothermal in the Imperial Borrego Valley and Owens River Valley ecoregion subareas.

Impact Assessment

Potential renewable energy development area on BLM lands within DRECP area groundwater basins under Alternative 4 is shown in Table IV.6-6 (solar only, geothermal only, and total renewable energy development for all technologies, including wind and transmission). Development would be in 23 groundwater basins. Most (85%) of the developed area is within three ecoregion subareas: Cadiz Valley and Chocolate Mountains, Imperial and Borrego Valley, and West Mojave and Eastern Slopes. There are geothermal projects in the Imperial Borrego Valley (4,000 acres) and Owens River Valley (1,000 acres) ecoregion subareas. Two ecoregion subareas (Kingston and Funeral Mountains and Piute Valley and Sacramento Mountains) have no planned development under Alternative 4.

Table IV.6-6 shows estimated total new water use by solar and geothermal projects within each ecoregion subarea. Total estimated water use was calculated using the projected megawatt distribution and water use factors as described above in Section IV.6.1, Approach to Impact Analysis. The water use shown in Table IV.6-2 assumes that dry-cooled solar thermal technology will be used because of water scarcity in the desert basins. Estimated total use is 35,000 ac-ft/yr, and ranges in available development areas from a minimum of 10 ac-ft/yr (Pinto Lucerne Valley and Eastern Slopes and Providence and Bullion Mountains ecoregion subareas) to a maximum of 27,000 ac-ft/yr (Imperial Borrego Valley ecoregion subarea) in the ecoregion subareas were development would occur . Wet-cooled geothermal projects account for about 33,000 ac-ft/yr of the total water use under Alternative 4. Ninety-seven percent of the total water use under Alternative 4 occurs in the Imperial Borrego Valley and Owens River Valley ecoregion subareas since they contains 5,000 acres of geothermal projects and almost 3,000 acres of solar projects.

Under Alternative 4, renewable energy projects can occur in a number of overdraft basins and groundwater basins identified as stressed. Figure IV.6-9 maps the distribution of estimated water use by DFA and overdraft groundwater basins, and Figure IV.6-10 maps water use by DFA, overdraft, and stressed groundwater basins. Development is planned in 17 overdraft and stressed groundwater basins, and the increased groundwater use in these sensitive basins can adversely affect water supplies and exacerbate impacts associated with overdraft conditions and declining groundwater levels. Existing regulations, implementation of CMAs, and additional measures required for renewable energy projects would mitigate impacts from development.

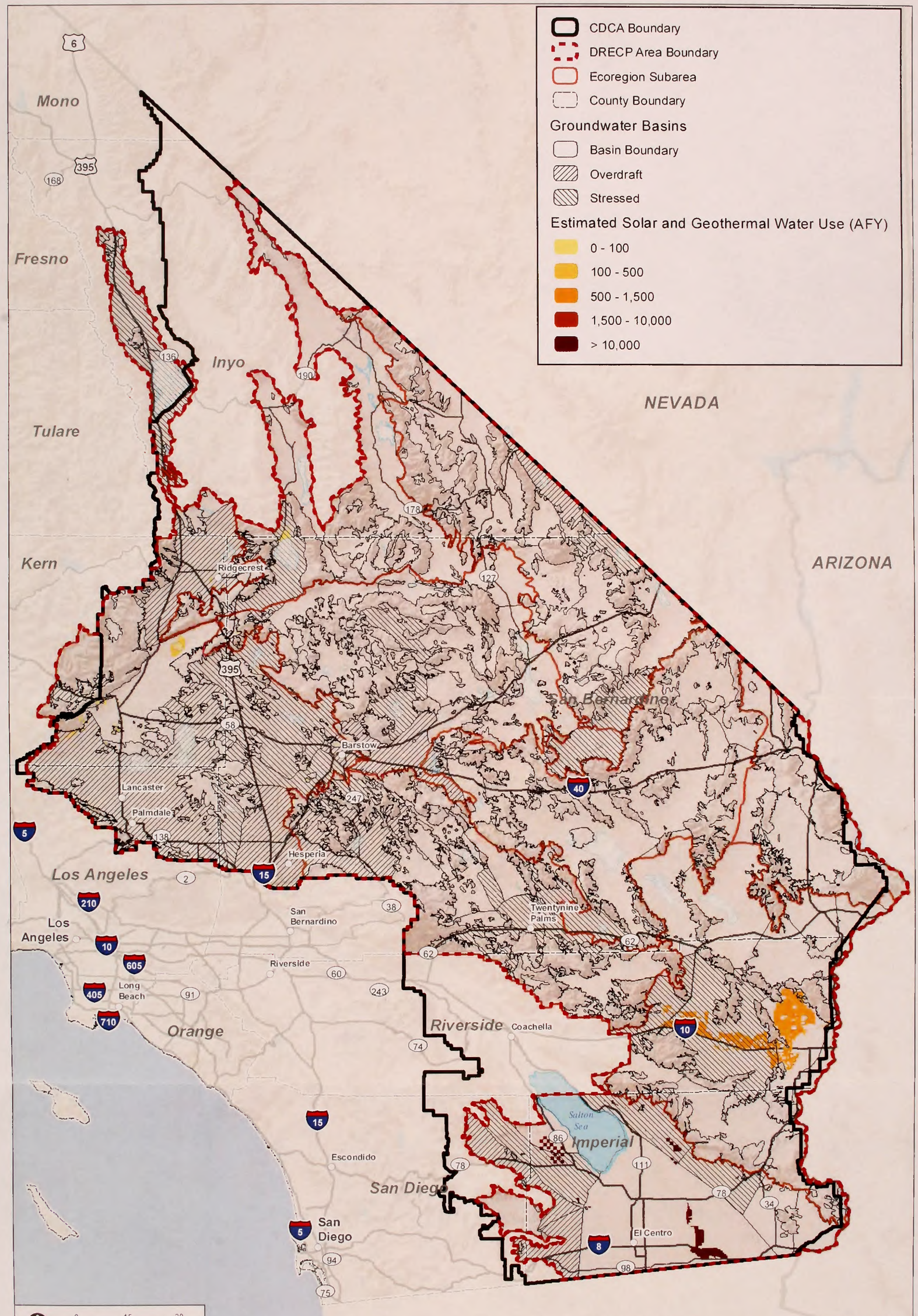


Sources: ESRI (2014); California Department of Water Resources (2003)

FIGURE IV.6-9

Planned Development Areas, Estimated Solar and Geothermal Water Use, and Overdraft Groundwater Basins - Alternative 4

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Sources: ESRI (2014); California Department of Water Resources (2003)

FIGURE IV.6-10

Planned Development Areas, Estimated Solar and Geothermal Water Use, and Overdraft and Stressed Groundwater Basins - Alternative 4

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Under Alternative 4, planned renewable energy development would be in basins hydraulically connected to adjacent areas located outside the DRECP area.(See Figure IV.6-9 for the locations and distribution of development areas.) Renewable energy projects are planned in groundwater basins connected to areas within Nevada (the Pahrump Valley basin, located in the Kingston and Funeral Mountains ecoregion subarea), Mexico (the Imperial Valley basin, located in the Imperial Borrego Valley ecoregion subarea), and Arizona (Palo Verde Mesa basin, located in the Cadiz Valley and Chocolate Mountain ecoregion subarea). Groundwater level and water supply changes can therefore extend across these boundaries and impact areas outside the DRECP area including the Colorado River.

Alternative 4 designates new NLCS lands, new ACECs and wildlife allocations, expands and reduces existing ACECs, designates new SRMAs, and expands and reduces existing SRMAs, and buffer corridors along National Scenic and Historic Trails. The BLM LUPA also replaces MUCs, and establishes VRM Classes in the CDCA. More than 4.5 million acres are assumed allocated in the BLM LUPA land designation under Alternative 4. Because the BLM LUPA land designations protect ecological, historic, cultural, scenic, scientific, and recreation resources and values, the use of or access to groundwater resources to meet renewable energy project water requirements would likely be limited.

Table IV.6-6
Renewable Energy Development Area and Estimated Water Use – Alternative 4

Ecoregion Subarea	Renewable Energy Development Focus Area (acres)			MW	Water Use (AFY)
	Solar	*Geothermal*	*Total*		
Cadiz Valley and Chocolate Mountains	27,000	0	33,000	5,000	1,000
Imperial Borrego Valley	2,000	4,000	11,000	1,000	27,000
Kingston and Funeral Mountains	0	0	0	10	<10
Mojave and Silurian Valley	0	0	3,000	20	100
Owens River Valley	800	1,000	2,000	300	7,000
Panamint Death Valley	700	0	700	100	30
Pinto Lucerne Valley and Eastern Slopes	200	0	4,000	100	10
Piute Valley and Sacramento Mountains	0	0	0	0	0
Providence and Bullion Mountains	200	0	200	20	10
West Mojave and Eastern Slopes	3,000	0	11,000	500	200
Total	**33,000**	**5,000**	**65,000**	**7,000**	**35,000**

Total megawatts for all technologies combined using the energy generation described in Appendix O (Methods for Megawatt Distribution).
Estimated solar thermal water use included industrial processes (0.5 ac-ft/yr/MW) and cooling (minimum estimate of 1 ac-ft/yr/MW represented by dry-cooled technology); photovoltaic water use for cleaning (0.05 ac-ft/yr/MW), and geothermal water use for cooling (assumed wet-cooled technology at 31 ac-ft/yr/MW); water use for wind assumed negligible.
Total development area is the sum of solar, geothermal, wind, and transmission project areas. Note that transmission acres include transmission only within groundwater basins.

Note: The following general rounding rules were applied to calculated values: values greater than 1,000 were rounded to the nearest 1,000; values less than 1,000 and greater than 100 were rounded to the nearest 100; values of 100 or less were rounded to the nearest 10, and therefore totals may not sum due to rounding. In cases where subtotals are provided, the subtotals and the totals are individually rounded. The totals are not a sum of the rounded subtotals; therefore the subtotals may not sum to the total within the table.

Under the Proposed BLM LUPA, the only changes outside the DRECP area would be the designation of NLCS lands, ACECs, National Scenic and Historic Trails management corridors, VRM Classes, and new land allocations to replace MUCs on CDCA lands. The estimated acreage of groundwater basins in BLM LUPA lands located outside the DRECP area under Alternative 4 is summarized in Table R2.6-11 (Appendix R2). Because the BLM LUPA land designations outside the DRECP area protect ecological, historic, cultural, scenic, scientific, and recreation resources and values, the use of or access to groundwater resources to meet renewable energy project water requirements would likely be limited.

Impact GW-1: Construction of DRECP components could alter groundwater recharge.

Impacts on groundwater recharge from land disturbance under Alternative 4 would be similar to those shown in Section IV.6.3.1.1. Alternative 4 potentially affects recharge on 65,000 acres.

Impact GW-2: Groundwater consumption lowers groundwater levels, depletes water supplies, and affects groundwater quality and groundwater discharge.

Impacts on groundwater levels would be similar to those shown in Section IV.6.3.1.1. The greatest potential water use is in the Imperial Borrego Valley and Owens River Valley ecoregion subareas (34,000 ac-ft/yr) ecoregion subarea, with most of the water use for geothermal technology (5,000 acres) and solar technology (2,800 acres). The remaining water use is mostly for solar technology located in the Cadiz Valley and Chocolate Mountains. Seventeen basins within these ecoregion subareas are in overdraft or are characterized as stressed (Figure IV.6-10). Groundwater use for renewable energy projects will likely exacerbate depletion of the water supply and the magnitude and scope of adverse impacts.

Impact GW-3: Groundwater consumption could cause land subsidence and permanently decrease storage capacity.

Land subsidence would cause impacts similar to those shown in Section IV.6.3.1.1. As shown in Table IV.6-6, renewable energy water use under Alternative 4 is 35,000 ac-ft/yr, with most of the water use attributed to geothermal and solar development in the Imperial Borrego Valley ecoregion subarea.

Impact GW-4: Groundwater consumption could cause existing poor-quality groundwater to migrate.

Impacts from the potential migration of poor-quality groundwater would be similar to those shown in Section IV.6.3.1.1. The large amount of renewable energy development could affect groundwater quality.

Impact GW-5: Injection of water for geothermal steam generation could contaminate potable water supplies.

The potential for impacts from injection of saline water for geothermal steam water is shown in Section IV.6.3.1.1. Geothermal development increases the potential for contamination, particularly in the Imperial Borrego Valley and Owens River Valley ecoregion subareas where geothermal development would be located.

Impact GW-6: Chemical spills or brine disposal could contaminate groundwater.

Groundwater contamination from chemical spills or brine disposal would be as shown in Section VI.6.3.1.1.

Impacts on Variance Process Lands

Variance Process Lands are neither reserve lands nor DFAs. They are a subset of the variance lands identified in the Solar PEIS ROD and additional lands that, based on current information, have moderate to low ecological value and ambiguous value for renewable energy. If renewable energy development occurs on Variance Process Lands, a LUPA would not be required, so the environmental review process would be somewhat simpler than if the location were left undesignated.

Variance Process Lands for each alternative are as shown in Chapter IV.1, Table IV.1-2 and in Volume II, Chapter II.6, Figure II.6-1 for Alternative 4. Development of the Variance Process Lands would have similar air quality effects as described above under Impacts GW-1 through GW-6.

Impact Reduction Strategies

Design Features of the Solar PEIS

The Solar PEIS includes Design Features (Appendix W) that would reduce the impacts of solar energy development, including: measures to control runoff (defined in WR1-1), measures to quantify groundwater aquifers and sustainable yield (defined in WR1-2), measures to secure a reliable and legally available water supply (defined in WR1-3), and impact reduction measures (defined in WR2-1, WR3-1, and WR4-1 for construction,

operation, and decommissioning, respectively). These measures would apply only on BLM SEZs and Solar PEIS variance lands.

Conservation and Management Actions

The conservation strategy for Alternative 4 (presented in Volume II, Section II.7.4) defines specific actions that would reduce the impacts of this alternative. The conservation strategy includes definition of the conservations designations and specific CMAs for the Preferred Alternative. The CMAs summarized in Section IV.6.3.2 apply to Alternative 4.

Laws and Regulations

Existing laws and regulations would further reduce the impacts of renewable energy development projects constructed subsequent to the Proposed LUPA. Relevant regulations are presented in the Regulatory Setting in Volume III, and summarized in Section IV.6.3.1.1.

IV.6.3.6.2 Impacts of Ecological and Cultural Conservation and Recreation Designations

The estimated acres of groundwater basins in Ecological and Cultural Conservation and Recreation Designations are summarized in Table R2.6-12 (Appendix R2). These lands include the existing protected areas (LLPAs and MEMLs) and Alternative 4 existing and proposed BLM conservation lands (NLCS lands, ACECs, and wildlife allocations. No renewable energy development is allowed on existing protected areas, and the use of or access to groundwater resources to meet renewable energy project water requirements would be limited. No adverse impacts are therefore expected to groundwater resources because of the conservation and recreation designations. Under Alternative 4, renewable energy development is restricted on over 2.4 million acres located within 37 overdraft or stressed groundwater basins, thereby protecting and preserving groundwater and water supply conditions in these areas.

IV.6.3.6.3 Impacts of Transmission Outside the DRECP Area

The impacts of transmission outside the DRECP area on groundwater, water supply, and water quality would be the same under all alternatives. These impacts are described in the No Action Alternative in Section IV.6.3.1.3, Impacts of Transmission Outside the DRECP Area in the No Action Alternative.

IV.6.3.6.4 Comparison of Alternative 4 With Preferred Alternative

Alternative 4 develops 5,000 acres less area for renewable energy projects than the Preferred Alternative (65,000 acres versus 70,000 acres, respectively). This lowers the

potential for chemical spills and groundwater contamination; but existing regulations and BMPs reduce potential groundwater contamination impacts in both alternatives. Renewable energy development has the potential to alter groundwater recharge; with mitigation these changes may increase groundwater recharge (e.g., installing pervious groundcover and directing runoff flows from a greater area to percolation basins). Because the developed area is smaller, Alternative 4 therefore has less potential to increase groundwater recharge relative to the Preferred Alternative.

Renewable energy projects in Alternative 4 are estimated to use less water than in the Preferred Alternative (35,000 ac-ft/yr versus 44,000 ac-ft/yr, respectively), with most of the water use for both alternatives from geothermal and solar technologies concentrated in the Imperial Borrego Valley. Existing regulations, implementation of CMAs, and additional measures required for renewable energy projects would reduce impacts under both alternatives. However, impacts from geothermal water use would remain for both the Preferred Alternative and Alternative 4.

Geographic Distinctions

Solar and geothermal technologies account for most renewable energy-related water use, so the locations of the projects and their associated groundwater use are important to consider. Alternative 4 develops solar and geothermal projects in 17 of the 39 overdraft or stressed groundwater basins in the DRECP area (Figure IV.6-10), where the Preferred Alternative develops projects in 15 of the basins (Figure IV.6-2). Alternative 4 therefore develops projects within more sensitive groundwater basins than the Preferred Alternative. Existing regulations, implementation of CMAs, and additional measures required for renewable energy projects would reduce impacts from development under both alternatives.

Under Alternative 4, no development is proposed in the Kingston and Funeral Mountains and Mojave and Silurian Valley ecoregion subareas. These ecoregion subareas have a small amount of proposed development under the Preferred Alternative. Under Alternative 1 there is no developed area adjacent to Nevada and the developed area is smaller adjacent to Mexico and Arizona (the Imperial Valley and Palo Verde Valley basins, respectively), reducing the potential for groundwater level and water supply changes that extend across their boundaries and impact areas outside the DRECP area and the Colorado River.

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